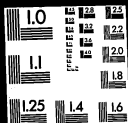


1 2 3 4 5 6 7 8 9 10 11 12
CENTIMETERS



14:1

Thomas A. Edison Papers

A SELECTIVE MICROFILM EDITION

PART V (1911-1919)

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**Thomas A. Edison Papers
at
Rutgers, The State University of New Jersey
endorsed by
National Historical Publications and Records Commission
18 June 1981**

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The original documents in this edition are from the archives at the Edison National Historic Site at West Orange, New Jersey.

ISBN 978-0-88692-887-2

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We thankfully acknowledge the vision and support of Rutgers University and the Thomas A. Edison Papers Board of Sponsors.

This edition was made possible by grant funds provided from the New Jersey Historical Commission, National Historical Publications and Records Commission, and The National Endowment for the Humanities. Major underwriting has been provided by the Barkley Fund, through the National Trust for the Humanities, and by The Charles Edison Foundation.

We are grateful for the generous support of the IEEE Foundation, the Hyde & Watson Foundation, the Martinson Family Foundation, and the GE Foundation. We acknowledge gifts from many other individuals, as well as an anonymous donor; the Association of Edison Illuminating Companies; and the Edison Electric Institute. For the assistance of all these organizations and individuals, as well as for the indispensable aid of archivists, librarians, scholars, and collectors, the editors are most grateful.

START

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A Note on the Sources

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filmed are the best copies
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**NOTEBOOK SERIES
NOTEBOOKS BY EDISON
AND OTHER EXPERIMENTERS**

**Notebook Series -- Notebooks by Edison and Other Experimenters
Recorder and Recording Experiments -- Miscellaneous Books**

These thirteen notebooks were used by E. Rowland Dawson, Clarence B. Hayes, William A. Hayes, Absalom M. Kennedy, Frank H. Losey, Walter H. Miller, George J. Werner, and others during the period 1915-1924 for notes on experimental recordings. The selected books primarily cover the period May 1915-August 1917, but there are also some entries from 1918-1921. Many of the experiments involve the use of various types of recorders and horns—as well as variations in the positions of horns, recording machines, instruments, and voices—in order to determine the optimum volume and quality of sound. Several books include maps and drawings to indicate the positions, as well as extensive information on the various horns used in the experiments. Some of the recording work was done at the Columbia Street Studio, where cylinders were dubbed or transferred from disc records and experimental work was carried out for long-playing and slow-speed recordings. Many of the Columbia Street recordings were intended for background music and sound effects for motion pictures. Some of the experimental work on cylinder-to-disc dubbings included attempts to re-record selections by artists that were no longer under contract with Edison. Considerable experimental work was also done on acoustical recording, with instruments in various positions and distances and with the use of long acoustical recording horns.

The eight notebooks containing substantial Edison comments or references to his work have been selected.

N-Number

Labels and Inscriptions on Front Cover

[additional information supplied by the editors appears in brackets]

Selected Books

15-05-04	"I-C-S Lessons. Experiments on Duplication. Also Disc Masters Made in Studio on London Mach. [G] J Werner - Alden St. Studio, W. Orange N.J."
15-08-02.1	"Record of Recorders"
15-11-19	"Mr Edison"
16-07-03.2	"Record of Recorders For Columbia St. Studio. G.J. Werner"
16-11-13	[obscured by tape]
20-00-00.3	"Mr. Edison Notes - Columbia St. Studio"
17-01-06	"Notes, Columbia St. Studio from Jan. 6, 1917"
19-01-10.2	---

Books Not Selected

15-10-20

"Columbia St. Studio Experiments F. Losey G.
Werner G. Burt. 1920"

16-01-11

"Record of Positions"

16-05-31

"Horn Experiments"

16-06-01.2

16-12-01.2

"Recorders used with long horn in Columbia St.
Studio, Dec. 1, 1916"

**Notebook Series -- Notebooks by Edison and Other Experimenters
Recorder and Recording Experiments -- Miscellaneous Books
Notebook, N-15-05-04**

This notebook was used by George J. Werner during May 1915-August 1917. One additional entry is stamped "Dec 13 1920." At the beginning of the book are lists of experimental recordings and kinetophone films made at the Alden Street Studio in West Orange, along with data about commercial stock on hand at the studio. Subsequent entries pertain to a series of duplication experiments, some described as "for T.A.E.," with various combinations of diaphragms, speakers, and horns. These include disc-to-disc, kineto-to-disc, cylinder-to-disc, disc-to-cylinder, and cylinder-to-cylinder. Also included are notes on a series of "surface scratch" and "long distance" recording experiments performed for Edison in 1917. Some of the long-distance experiments involved the recording of various sounds in and near the laboratory yard, possibly for use as motion picture sound effects. Other entries describe an experiment for William F. Nehr that varied the speed of the recording machine; an experiment in which a dictating machine was used to record telephone calls; and a series of experimental cylinder recordings prepared for the DeForest Radio Telephone & Telegraph Co. Entries from June 1915 list all disc masters made in the studio on the "London Machine," including one recorded for Mina Miller Edison. Also included are lists of master recordings made for language lessons, with notations regarding which reproducer horn, recorder horn, recorder, and speaker were used. Two notes by Edison, one to Werner and the other to Charles T. Dally, are pasted into the book. The names and addresses of several recording artists appear at the end of the book. The front cover is labeled "I-C-S Lessons. Experiments on Duplication. Also Disc Masters Made in Studio on London Mach. [G] J Werner - Alden St. Studio, W. Orange N.J." The pages are unnumbered. Approximately 50 pages have been used.

59890

Acme Co.,

MFG. STATIONERS,
96 JOHN ST.
AND
19 PLATT ST.
NEW YORK.

Definitions of abbreviations

- R - Record
- R* - Double Amplified Record
- F - Film
- K - Kitchen
- U - Upstairs in Dressing Room

Russian.

- 132A. R. 101 Krupny Longe. F & R. U.
 133A. R. 102 Russian Lecture. " " "
 134A. R. 103 Concert #2. " " "
 135A. R. 104 Musical Clavier (1st Edition) " " "
 136A. R. 105 Russian Longe & Dance. " K
 148B. R. 107 Gzas Lector Ivanovitch. " U.
 152B. R. 109. Comit of Luxemburg. a. Grand U. K
 153B. R. 110. Dance of the Little Blackbird. " K
 154A. R. 111 - The Vocal of First " U.
 170A. R. 112 Act from the Opera the Jewess " U.
 171B. R. 113 Aria of Elvira from the Jewess. " "
 172A. R. 114 Operetta Nelli. Act 1 " "
 173A. R. 115 On the Dance of Passion. " "
 175B. R. 116 Tsarina Hungarian Dances. K
 176A. R. 117 Giuseppe " U.
 177A. R. 118 Ball of Cornville. " K
 178A. R. 119 Musical Clavier " U.
 179B. R. 120 L. Kryz, Story teller. " "
 182B. R. 121 Costa Colomandi " "
 183B. R. 122 The Dog Tax " "
 184B. R. 123 Songy Operetta " "
 185A. R. 124 Scenes of St. Petersburg. Part I. " "
 186A. R. 125 " " " Part II. " "

197 B R 126 Concert Nocturne Polka-horn J. R. U.
 198 B R 127 Lenses Gypsy Life Part 2 " " "
 199 B R 128 Concert Polka-horn " " "
 205 B R 29 Workingman's Song. " " "
 203 A R 30 The Hussars " " "
 204 B R 131 I have but what I deserve " " "
 205 A R 32 Lenses in the garden. " " "
 206 A R 33 A May night. " " "
 207 A R 34 East of Himmelfoff. " " "
 144 A R 108 Crime + Punishment " " "
 209 A R 135 The Pitter Mouse " " "
 210 A R 136 Trigel-pistachik + Son " " "
 213 B R 138 Lullabies Serenade " " "
 215 B R 139 The Demon and a Messenger " " "
 216 B R 140 By a Dark Night " " "
 217 B R 141 Attack of the Doctors " " "
 219 A R 142 Carmen, Gypsy song " " "
 220 A R 143 Appearance of Jorador " " "
 227 B R 137 The Prison " " "
 228 A R 144 Garden in Moonlight " " "
 229 A R 145 Carmen, Final Scene " " "
 242 B R 149 Life Guardsman Pt 1 " " "
 243 B R 150 " " " 2 " " "
 244 B R 151 " " " 3 film " " "
 232 B R 146 Life for the Czar. Begonia film " " "
 233 B R 147 Allah, Verd + Days of our life " " "

234 B R 148 Roumanian Song + Homage to P. R. U.
 237 A R 152 Jungs Duett from Night Express " " "
 238 B R 153 Concert by M. Davidoff " " "
 239 B R 154 " " " " " "
 240 A R 155 Duett from Vital of Chre " " "
 241 B R 156 Trio " Night Express " " "

Experiments #20.

2 samples on record.

First. 1470 (with carriage)

Second 1470 (without carriage.)

Porcupine Reg - Band.

Austrian, Italian, French, Swedish + Others.

918.	Das Rote Kreuz.	F	R	U
944.	De Groot Nieuw Tolkene.	"	"	"
952.	Archetopliu Embreslet.	"	"	"
992.	Limpice Vagabundus. 2 Parts.	"	"	"
1002.	Loth Jost Quatrefon Edition.	"	"	"
1082.	Der Katholische Kerket.	"	"	"
1092.	Opfer der Feile.	"	"	"
1102.	Wincaten Vor Paire.	"	"	"
1152.	Faust	"	"	"
1152B.	Faust	F	R	K
1272.	Heimat.	"	"	K
1382.	Das Kesselbad.	"	"	U.
1416.	Fritze Kelly + Juhl Verlies.	"	"	"
1562.	Kriegsru.	F	"	"
1592.	Stassensche - 3 Parts	"	R	K
1572.	Abchied Landwehrk.	"	"	U.
1587B.	Unde	"	"	K
1597B.	Riccolillo a. Rund 16	"	"	K
1602.	Hugon	"	"	K
1612.	Faust.	"	"	K
1622.	Carollina Fortissima.	"	"	K
1632.	El Tratoro, La Tira.	"	"	K
1642.	Samson + Dabla.	"	"	K
1652.	Carman.	"	"	K
1662.	Luna De Sammarino.	"	"	K

167b. La Bohème.	K	F	R
168B. L'Esclave. (Final Scene)	K	"	"
169a. Mame's Liebling - 2 Parts.	K	"	"
174d. Die Puppe, 3 Parts.	K	"	"
180B. Der Pazzo.	K	"	"
181a. Anna's Liebesmuth.	U	"	"
182B. Brage. Brage, Bragejane.	K	"	"
184a. Patti's Lovers.	U	"	"
189d. Julewit & Goro's Begyleressen.	K	"	"
106B. Diecke Geister	K	"	"
138a. Das Riesenkind	U	"	"
89a. "1813"	"	"	"
96B. Tales of Hoffmann	"	"	"
101a. Das Welterbrochen Ständchen	"	"	"
107a. Baron Munchausen	"	"	"
108a. Brage und Antwort	"	"	"
114a. Lesue de la vie Paris	"	"	"
112a. Die Fledermaus 3 pts	"	"	"
111a. Wenn Weib und Gesang	"	"	"
118a. Swedish Lecture	"	"	"
126a. Sonnets du godna du fria	"	"	"
143B. Der Huthenschleudner	"	"	"
144a. Solo Vorträge	"	"	"
145a. Madl. Hark an die Treue.	"	"	"
146a. Hosi & Lust Soldat zu sein.	"	"	"
189B. Magyar Conference (Hind. Lecture)	"	"	"

151A. Kinder im Walde	U	R
201B. Das Camer Truel Song	"	"
185. Gintlet 2 parts	"	"
202B. Madl. Das Camer Truel Song	"	"
235A. Humi. Rieder aus der Riedermitzigt	"	"
236a. Herta de Melha Viol. Kunstst.	"	"
218B. Nach dem Herrschaftend	"	"
208B. Das Jahrtausend Truster	"	"
212B. Concert Grocke & Lola	"	"
214B. Ein Kunstst.	"	"

Test, and Experimental subjects
made at Alden St. Studio.

Mr. Head - test for side lighting	F.	U. K
K 4 Ten. Head Lett + Doyle (test)	F.	U. K
Doyle, Bush. + Lett (light test)	F.	U. K
Lett with white hat (side light test)	F.	U. K
Lett - large head focus test & focus of camera	F. U. K	
Lett - seated - stereoscopic test	F. U. K	
Mr. Hutchingson + (A. M. H. Braden + Bar	F. U. K	
Shawm John Doyle (steel gate test)	F. U. K	
Test of "Dining Room Set"	F. U. K	
Mr. Hutch. 14 Maxwell	F. U. K	
Crystal Lake test	F. U. K	
Price of Negative of Hutchinson's fireworks	F. K	
Negative of Humphreys double negative	F. U. K	
2 Camera Clarence test of Chas. C.	F. K	
Bob Lett Monologues Good Bye Bye	F. K	
K 7 X Mrs. Brooks + Young lady	R + F. U. K	
M. R. H. + Party taken in Bronx	R + F. K	
Lesson in Photography since 1883	R + F. K	
K 5 On the Way to Mexico	F. U. K	
K 2 M. R. H. Portrait	R + F. K	
Bob Lett + Pirates and the boys	F. U. K	
K 12 " in Room back of Chin	F. K	
K 11 Lett, Doyle (Hutchinson) etc makeup test	F. U. K	
K 11 D Third Exposure	R + F. K	

Lecture by Humphreys (lyd. test)	F	U	F
K-10 Mrs. Clark & Reth dancing	R	F	K
Reth, Kennedy, Annwood & Reth (test)	F	U	F
K-9 Mrs. Clark singing	R	F	K
K-7A Portrait of Mrs. Brooks alone	R	F	U
K3 Portrait of Bob Reth	R	F	K
K-8 Maywell Party (demonstration)	R	F	K
140 Violin Solo	R		K
Band selections (direction)	R		K
Experimental Record Amp. track		U	
Camera Stereo Test	F		K

Regular Commercial Subjects
produced in Alden St. Studio

250a+b Portuguese Lecture H. R. H.
231a.B+b Janet " " "

Regular American Stock on hand

Frank B. Record & Son	£	11.
Nursery, Savannah Ga.	5	7.
Heath & Son, B.	5	11.

5/4/15.
 DUPLICATING
 EXPERIMENTS & DATA.

COMBINATION FOR FULL TONE RECORD OF
 *3695-C-1 "Australia's Chicken Dinner" by. Cullen & Hay-

len. — DISC HORN NO. 13.
 RECORDING M. NO. 3 B. } THIS SEEMS TO BE O.K.
 SPEAKER NO. 2.
 DIAPHRAGM NO. 2. }
 LONG TUBE USED, WITH ALL HOLES OPEN IN 3 B. HORN.

GOOD COMBINATION FOR "RIPPLING WATER" BAND.

*2589-C — DISC HORN NO. 13.
 RECORDING M. NO. 3 B. } THIS SEEMS O.K. L.W.S.
 DIAPHRAGM NO. 2.
 SPEAKER NO. 1. }
 LONG TUBE USED. ALL HOLES OPEN IN THE HORN 3 B.

DISC TO DISC DUPLICATION.

IN WAX IT SOUND VERY GOOD WITH THIS
 COMBINATION.

HORN NO. 3 ON REPRODUCING MACHINE
 HORN NO. 7 ON RECORDING MACHINE
 SPEAKER NO. 2. WITH 37/1000 BALL IN IT.
 RECORDER NO. 73. 14 WAX.

JAN. 5, 1916.

Speed Experiment for Rehr.

1st. Recording Machine running 160 R.P.M.
Ree. Mach. 80 R.P.M.

2nd Recording Machine 145 R.P.M.
Ree Mach. - 80 R.P.M.

Sgt. Billy Murray.
Up Barn floating down the old
Green River.

Recorder used. #1.
Ree. Speaker used #6.
Recording Mach. Horn 7 1/2
Ree Horn - 3.

Best results on disc sub. were:

1 2 3 4 5 6 7 8 9 0
1 2 1 2 3 2 1 1 3 ✓ Best.

on the letters - R. T. M. H.
3 3 1 1 Best.

3/24/16

Mutual Electric Phone Call Records.

Spec. No. 1. Phone Call #7 & H.
2 M. Recorder #7. Miller Right-Wright
disc speaker.

Spec. No. 2. Phone Call #1
(Same as above.)

Spec. No. 3. Phone Call #7.
(Same as above.)

Above machines 80 rev. per min. made
Commercial Dictating Machine
synchronized by geared rod with
disc machine.

(Painted with Light Pearl)

DEC 13 1920

SERIAL NO. 14970 -

200 THREAD PER INCH
140 REVOLUTIONS PER MINUTE.

SHOP CODE NO. 10,007. I33267

LABEL:-

SAN FRANCISCO LIGHT VESSEL #70 -

(WORDING)

"SAN FRANCISCO LIGHT VESSEL NO. 70"

(LOAD)

(REPEAT 3 TIMES - MAXIMUM SIGNAL STRENGTH)

"YOU ARE GETTING CLOSER"

(1/2 LOAD)

(1/2 MAXIMUM - SIGNAL STRENGTH)

"YOU ARE VERY CLOSE" KEEP OFF"

(MINIMUM SIGNAL STRENGTH)

(NET)

MORSEY E.W. MEEKER

RECORDED NO. 234

DISTANCE FROM 7' - 24' - 24'

MASTERS - 51-52-53-54

(7 Lines through
on cylinders)

NUMBERS H.M.R.T. MASTER BLANKS USED - 12 -

" WHITE'S MHOE - 51-52-53-54

UNDER DIRECTION OF MR. FRIEDMAN, INSPECTOR OF SHIPBUILDING

NATIONAL B.S.M.

44 COURT ST. BROOKLYN, N.Y.

W.B. CONNOR,

RADIO LABORATORY, BAYVIEW, N.Y.

NAVY YARD, BROOKLYN, N.Y. C93

OCT 12, 1915.
EXPERIMENT OF
DUPLICATING FROM KINETO TO DISC.

COLLEGE DAYS³ - TO - DISC.
LONDON DISC MACHINE USED.
RECORDER - NO. 73.
KINETO HORN - 3A. *1
DISC HORN - 7C

MADE SAMEWAY AS ABOVE *2
ONLY WEAKER. COTTON IN SPEAKER.

AUG 30 1917

EXPERIMENTAL 4M. CYL. RECORDER
FOR DE FOREST RADIO TELEPHONE

& TELEGRAPH CO.

1391 SEDGWICK AVENUE.

REQUISITION S.O. 5011

SPEC. SHCP ORDER NO. 8133-

LABEL - D.F.W. POINT TWIDITH LIGHT { D.
E.

MASTER NO. D.

MADE IN EDN. W. MEERER

DIRECT RECORDED.

RECORDER NO. A1

HORN 3A, VELVET EDGE.

DISTANCE FROM HORN { D-5"
E-

4M. FEED. - 140 R.P.M.

WORDING - P.T.L-5sec. - P.T.L-5sec - P.T.L-

2sec. - NOW ARE GETTING CLOSER - KNEE OFF - 2sec -

(4 REPEAT.)

MASTER E

SAME AS D.

CYL. SERIAL NO. 13769-

1 known to me as Master D.

2 Master E.

MAY 12 1917

EXPERIMENTAL 4M. RECORDED CYL.
FOR DE FOREST RADIO TELEPHONE

& TELEGRAPH CO.

1341 SEDGWICK AVENUE,

NEW YORK, N. Y.

REQUISITION 3.0. 5011, P. J. L. L. L.

SPECIAL INQ. ORDER NO. 8125 ABC

MASTER NO. A.

MADE BY EDW. W. MEEKER,

DIRECT RECORDED.

RECORDER NO. A1

HOHN 3 A, VELVET EDGE.

DISTANCE MEEKER FROM HOHN } 1-5 1/2"
3-3"

4 M. FEED. SPEED 140 R.P.M.

WORKING ON RECORD: "POINT JUDITH LIGHT,

(3 TIMES) - YOU ARE GETTING

CLOSER, KEEP OFF" (ONCE)

REPEATED
25 TIMES

MASTER NO. B.

REPEATED SAME AS A. ONLY, ~~NEW~~
24 TIMES LITTLE LOADER.

MASTER NO. C.

REPEATED SAME AS A.
24 TIMES VOLUME BETWEEN A+B.

CYL. SERIAL NO. 13620.

MAY 17 1917

EXPERIMENTAL 4M. RECORDED CYL.
FOR DE FOREST RADIO TELEPHONE

& TELEGRAPH CO.

1341 SEDGWICK AVENUE,

NEW YORK, N. Y.

TREMBLE 4052

REQUISITION

MASTER NO. 1.

3.0.

MADE BY ED. MEEKER, 5011.

DIRECT RECORDED.

SPECIAL SHIP ORDER

RECORDER NO. A1

8108.

HERN 3 A, VELVET EDGE.

DISTANCE MEEKER FROM HOHN 5 1/2"

4 M. FEED. 160 SPEED.

WORKING ON RECORD: "POINT JUDITH

LIGHT, THREE TIMES,

THEN "YOU ARE GETTING CLOSER; KEEP OFF."

REPEATED 19 TIMES, 10 SECONDS MARK,

MASTER NO. 2.

SHADE WEAKER THAN NO. 1, OTHERWISE
ENTIRELY THE SAME. (REPEATED 18 TIMES)

MASTER NO. 3.

SAME CONDITIONS AS NO. 1, ONLY
MUCH SLOWER, AND EMPHATICALLY SPOKEN.

(REPEATED 12 TIMES)

CYL. SERIAL NO. 13544.

2490

HERBERT FRYER'S
Selections tried. JUNE 15, 1915.

HUNTING SONG. 1 1 MASTER OF THIS.

ROMANCE IN F# 2

SCHUMANN - OP. 28.

CHOPIN'S FUNERAL MARCH. 3

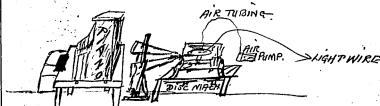
(G. Schirmer Publisher.)

L100

DISC MASTERS MADE
IN STUDIO ON LONDON MACHINE
SINCE JUNE 1, 1915. ALL PREVIOUS
RECORDS WILL BE FOUND IN BACK OF
CYLINDER BOOK #2 & 3.

JUNE 15, 1915.

DISC RECORD FOR MRS. EDISON.
PIANO, UPRIGHT, MASON & HAMLIN.
DELIVERED TO STUDIO JUNE 12, 1915, P.M.
TRAIL OF HERBERT FRYER.
PHONG LL6 OYANG, N.T.



PIANO STAND 30" FROM FLOOR TO BASE
DISC MACHINE 30" FROM FLOOR TO TABLE
& HORNS USED NOS. 3 & 7.

RECORDER - 9 - RESULT.

NO. MASTERS MADE - 1.

DELIVERED TO C.D. HAYES FOR PLATING - 6 - 15.

DISTANCE FROM BACK OF PIANO TO EDGE OF
RECORDING HORNS - 22 1/2".

DISTANCE FROM FLOOR TO EDGE OF HORN - 48 1/2".

Nov 4th 1915

In C-S Lesson # 1 + 2 French

Master #1

Speaker Model C-2 M. Repet. Form #3

Pupil #48

Pupil #72

Without slide

Master #2

Speaker Same as above

Repet. Form #3

Pupil #48

Pupil #72

With slide given 1st notch

French Lessons # 3 and #4

Special #1

Speaker Model C-2 M.

Repet. Form #3

Pupil #48

Pupil #72

Slide on but closed.

Special #2

Same as #1 only slide given
to the 1st notch.

Apr 5th 1915

I-C-S - Spanish Lessons #1 - #2

Special #1

Speaker - Model C-2M. Reps H. 3 R. H. 2°

Insert - Limit - no slide Records 48

Special #2

Speaker - same as #1 Reps H. 3 R. H. 2°

Insert - same as #1 Records 48

I-C-S - Spanish Lessons 3 & 4

Special #1

Speaker - Model C-2M. Reps H. 3 R. H. 1°

Insert - Limit - no slide Records 48

(Switched end of Lesson #3)

Special #2

Same as #1

Apr 5th 1915

I-C-S. Spanish Lessons #5 - #6

Special #1

Speaker - Model C-2M. Reps H. 3 R. H. 2°

Insert - Limit - no slide Records 48

Special #2

Same as #1

Spanish Lessons #7 and #8

Special #1

Speaker - Model C-2M Reps H. 3 R. H. 2°

Insert - Limit - no slide Records 48

Special #2

Same as #1

Spanish Lessons #9 - #10

Special #1

Speaker - Model C-2M Reps H. 3 R. H. 2°

Insert - Limit - no slide Records 48

Special #2

Same as #1

Nov 6. 1915

I-C-S. Spanish Lessons 11-12
Speaker Model C-2M Rpt. H 3. R. H 7.
Insert - all engine slide Rnd. 4K

Special #2 same as #1

I-C-S. Spanish Lessons 13-14
Special #1 Same as above
" #2 " " "

I-C-S. Spanish Lessons 15-16
Special #1 Same as above
" #2 " " "

Nov 6. 1915
I-C-S. Spanish Lessons 17-18
Same as above Special #1
" " " " #2

Lessons 19-20

Special #1 Same as above
" #2 " " "

Lessons 21-22

Special #1 Same as above
" #2 " " "

Lessons 23-24 Special 1-2 Same as above
" 25 " 1-2 " "

Nov 9. 1915

I-C-S. French Lessons 5-6
Specials #1 and 2 same as Spanish.

I-C-S. French Lessons 7-8
Specials #1-2 same as above.

I-C-S. French Lessons 9-10
Specials #1-2 same as above.

I-C-S. French Lessons 11-12
Special #1-2 same as above only
Rpt. machine slowed down on
#12 to 14 words only 10 seconds
as original 2 min. set. was taken
at slow speed.

I-C-S. French Lessons 13-14
Specials 1-2 same as 9-10

I-C-S. French Readers 1-2
Specials 1-2. owing to machine
sounding slow and fast on me
compelled to slow up on Reader #1
and speed up on Reader #2, but
only a trifle, in both cases.

Nov 9th 1915

J. C. S. French Lesson # 30
~~Special #1 made with same length
stick as previous lesson but making
making run longer #2 made
stick 90 degrees~~ Nov 10th 1915

J. C. S. French Lesson # 15 Special 1-2
Made same as 9-10.

J. C. S. French Lesson # 16-17-18-19 Special 1-2
Made same as above.

J. C. S. French Lesson # 20-21-22-23 Special 1-2
Made same as above.

J. C. S. French Lesson # 24-25-26-27 Special 1-2
Made same as above.

J. C. S. French Lesson # 28-29-30 Specials 1-2
Made same as above.
#30 spindles long as it is irregularly made
my best.

11-15-15

I.C.S. German Lessons 1-2

Spinals 1-2

Speaker: Herd C. 2 M. R. H. #3 R. H. 7a

Insect - Lumber

Reader 48

#2 Lesson had sound like me walking in song

I.C.S. German Lessons 3-4

Spinals - 1-2 - same as me.

I.C.S. German Lessons 5-6

Spinals 1-2 - same as me

11-16-15

I.C.S. German Lessons 7-8

Spinals 1-2 made same as me
Small knots in Lesson #7 made

I.C.S. German Lessons 9-10

Spinal - 1 -

Made of #9 developed defect
which under microscope looks like
many chips and cannot repeat
for this reason we could make
but one master.

I.C.S. Spanish Lessons 5-6

Spinals 1-2. Made same as me

11-16-15

I-C-S German Lessons 11-12
Specials #1-#2 Made same as 9-10

I-C-S German Lessons 13-14
Specials #1-#2 Same as 11-12

I-C-S German Lessons 15-16
Specials #1-2 Same as 13-14

^c 11-17-15
I-C-S German Lessons 17-18-19-20
Specials 1st-2nd Same as 15-16

I-C-S German Lessons 21-22-23-24
Specials #1-#2 Same as 17-18

I-C-S German Lessons 25-26-27-28
Specials #1-#2, Same as 21-22

I-C-S German Lessons 29-30
Specials #1-2 Same as 25-26

I-C-S German Reader 1-2
Specials 1-2 Same as 29-30

Reader #1 Teacher has margin notes
sounds as though several pupils have
been holding conversation in reading room

11-23-15

I-C-S. English Lessons 3-4
Specials 1-2 Same as above

I-C-S. English Lessons 5-6
Specials 1-2 Same as above

I-C-S. English Lessons 7-8
Specials 1-2 Same as above

I-C-S. English Lessons 9-10

" " " 11-12

" " " 13-14

" " " 15-16

Made same as above Specials 1-2

11-24-15

I-C-S. English Lessons 17-18

" " " 19-20-21-22

" " " 23-24-25-26

" " " 27-28

" " " 29-30-31

Specials 1-2 Same as above

Q-C.S.

11-29-15

Italian Lessons

#1-#2	<i>Specials</i>	1-2
Made same as other language		
#3-4	<i>Specials</i>	1-2
#5-6	"	1-2
7-8	"	1-2
9-10	"	1-2
		11-29-15
11-12	<i>Specials</i>	1-2
13-14	"	1-2
15	"	1-2

Oct. 9, 1916.

*Lummi's Kinetophone Record for
Commercial Shm.*

Made in New St. Studio 10/10 P.M.
by Harry C. Humphrey

Musical Instrument by Best recording.

3 masters made A. B. & C.

C held for extra (mistake in it)

A & B delivered to A. Wirth's Sept. 10/11 P.M.

Diaphragm C used.

Ham (Oct. 10/11) used.

6 Jumbo Blanks used.

Best master with sufficient ball.

B better than A.

Ship order for about 8064 Special

Time is charged - 1 1/2 days must start.

NO. 1 EXPERIMENT

SEPT. 18, 1916

DUBBING FROM CYL TO CYL.
FROM MASTER MADE BY KENNEDY.
BLUE SUB.

LABELED - EX 1 T. 61-27 77
HORNS 13+20
REG. R. A. SPEAKER.
1st. TRAIL RECORDER 211.
2nd. " " 77

NOV. 29, 1916

EXPERIMENT NO. 1 FOR T. A. E.
FROM CEL. SUB. TO DISC WAX.
CEL. SUB. NO. 5150-C-1
HONOLULU, AMERICA LOVES YOU. A. FIELDS.
HORNS 13+14
RECORDER - 73
SPEAKER NO. 1
INSERT. - LIMIT.
ELBOW. - NO. 3

EXPERIMENT NO. 2. FOR T. A. E.
FROM CEL. SUB. TO DISC WAX.
CEL. SUB. NO. 4992-B-6
GARDEN DANCE, MARIMBA BAND.
HORNS - 13+14
RECORDER NO. 73.
SPEAKER NO. 1
ELBOW NO. 3
INSERT CUT ABOUT 2 INCHES

DEC. 8, 1916

EXPERIMENT NO. 3 FWT.D.E.

FROM CEL. SUB. TO DISC WAX.

CEL. SUBS. NOS. 5059B1 + 5017C2

HORNS 13 + 18

RECORDER NO. 20

SPEAKER NO. 1

ELBOW NO. 1

INSERT. 1ST X ON LOW & DOUBLE NOTES
OUT A LITTLE ON ALL.

2nd. LIMIT UNTIL FEMALE VOICE
THEN X -

EXPERIMENT NO. 4 FWT.D.E.

FROM CEL. SUB. TO DISC WAX

CEL. SUBS. NOS. 5059B1 + 5017C2

HORNS 13 + 18

RECORDER NO. 4.

SPEAKER NO. 1

ELBOW NO. 1

INSERT - SAME AS IN NO. 3.

FEB. 12, 1916

EXPERIMENT FOR W.H. MILLER.

DUB. FROM CYLINDER TO DISC.

CLY. RECORD OF MME. BERNHARDT. *35607-1

"L'AIGLON" LA PLAINE DE WARRAM "

HORNS 13 CIL. 20 DISC.

RECORDER NO. 4.

7:00 PM. SPEAKER NO. A 11776.

INSERT - LIMIT.

DISC MASTER DELIVERED TO MR. MOSS
7/4/17 AM.

SURFACE SCRATCH
RECORDING FOR T.A.E.

MAR 9-1917

DARK WAX NO. 1

DISC:- SURFACE EXPERIMENT #4587A
COMMERCIAL PRINT.

SPEAKER #5 - 80 R.P.M. H. 13

CYLINDER:- DARK WAX BLANK (E)

2 M. FEED.

$\frac{40}{1000}$ STYLUS, H-18

RECORDED #2

160 R.P.M., DIAMETER OF DARK WAX $2\frac{1}{32}$ "

MAR 9-1917

LIGHT WAX NO. 2

DISC:- SURFACE EXPERIMENT #4587A
COMMERCIAL PRINT.

SPEAKER #5 - 80 R.P.M. H. 13

CYLINDER:- LIGHT WAX 47A, BLANK. (E)

2 M. FEED. $\frac{40}{1000}$ STYLUS

RECORDED #2

DIAMETER OF LIGHT WAX $2\frac{1}{32}$ "

160 R.P.M. H. 13

MAR 10 1917

LIGHT WAX NO. 3

SAME AS #2 EXCEPT USED
RECORDER #3A. $\frac{1}{1000}$ STYLUS
THIS ONE GRAPHTED BY WURTH
TO SEE IF IT SHOWS UP OUT BETTER.
HORN 13 + 18

MAR 10 1917

DARK WAX NO. 4.

SAME AS #3 ENTIRELY,
2A RECORDER. $\frac{1}{1000}$ STYLUS.
HORN 18 R.M. DICH 13

MAR 10 1917

DARK WAX NO. 5.

DISC. - SURFACE EXPERIMENT NO. 4587A.
COMMERCIAL PRINT.
SPEAKER NO. 5. 80 R.P.M.
HORN NO. 13

CYLINDER. - DARK WAX BLANK

4M. FEED
RECORDER NO. 2. $\frac{1}{1000}$ STYLUS
DIAMETER OF DARK WAX $2\frac{1}{32}$ "
80 R.P.M.
HORN NO. 18.

MAR 10 1917

LIGHT WAX NO. 6.

SAME AS NO. 5 ONLY ON LIGHT WAX.
DIAMETER $2\frac{1}{32}$ "

MAR 12 1917

DARK WAX NO. 7

DISC. SURFACE EXPERIMENT NO. 4587A
COMMERCIAL PRINT.
SPEAKER NO. 5. 80 R.P.M.
HORN. 13.

CYLINDER. -

DARK WAX BLANK.
4M. FEED. .008 NEEDLE.
RECORDER NO. 2. (CHANGED TO .008
DIAMETER DARK WAX $2\frac{1}{32}$ "
80 R.P.M.
HORN. #18.

MAR 12 1917

LIGHT WAX NO. 8

SAME AS #7 ONLY DIFFERENCE
IN WAX.

MAR 12 1917

LIGHT WAX NO. 9.

DISC:- SURFACE EXPERIMENT NO. 4587A

COMMERCIAL PRINT.

SPEAKER NO 5 - 80 R. P. M.

HORN 13.

CYLINDER:- LIGHT WAX BLANK.

H.M. FEED

.008 STYLUS.

RECORDERS 22.

DIAMETER OF BLANK $2\frac{1}{2}$ "

160 R. P. M.

HORN #18.

MAR 12 1917

DARK WAX NO. 10.

DISC:- SURFACE EXPERIMENT NO. 4587A.

COMMERCIAL PRINT.

SPEAKER NO. 5 - 80 R. P. M.

HORN 13.

CYLINDER:- DARK WAX BLANK.

H.M. FEED

.008 RECORDERS NO. 77

DIAMETER OF BLANK $2\frac{3}{16}$ "

160 R. P. M.

HORN #18.

FOR MR. EDISON.

APR 3 - 1917

LONG DISTANCE RECORDING.

*30 CYLINDER REPRODUCING MACHINE

65 ft. from Horn of Recording Machine
IN BUILDING #4.

KINETO HORN ON RECORDING MACHINE

RING COTTON MARCH-BAND ON REPRODUCING
MACHINE

*8A RECORDER USED.

.008 NEEDLE

80 R. P. M. RECORDING MACHINE

160 R. P. M. REPRODUCING MACHINE.

1ST. TRIAL INSIDE BUILDING #4

2ND TRIAL OUTSIDE OF BUILDING #4 ON PATH.

APR 3 - 1917

LONG DISTANCE.

*35 RECORDER

1ST TRIAL 60 ft

2ND " 44 "

3RD " 34 "

4TH " 24 "

5TH " 14 "

INSIDE
BUILDING
#4

SAME AS ABOVE OTHERWISE.

#14.

APR 11 1917

SOUNDS IN AIR, RECORDED IN LAB. YARD.
AT ABNT 1:30 P.M.

H.M. CYLINDER, GRAPHITED.
008 STYLUS IN RECORDER NO. 2.
LARGE BRASS HORN, H.M. FEED
160 R.P.M. RECORDING MACHINE.

PRINCIPLE SOUNDS:-

3 TROLLEY CARS ON FIRST HALF OF CYL.
FRED OTT IN ELECTRIC AUTO PASSED IN
FRONT OF HORN.
AUTO TRUCK, BRITISH EXPRESS WAGON,
HAMMERING IN LAB.

#15

APR 11 1917

SOUNDS IN AIR, RECORDED IN LAB. YARD. 1:40 PM
SAME AS NO. 14 ABOVE. EXCEPTING SOUNDS
PRINCIPLE SOUNDS.

TROLLEY CAR.
AUTO TRUCK & HORN
MAN WALKING IN FRONT OF HORN.
FORD AUTO IN YARD, EARLY CLOSE.
HAMMERING IN MACHINE SHOP OF LAB.
ON AUTO IN YARD.
LABORATORY DOOR SLAMMED.

#16

APR 11 1917

SOUNDS IN AIR, RECORDED IN LAB. YARD. 1:45 PM
MECHANICALLY SAME AS #14 & 15.

PRINCIPLE SOUNDS.

CHARLIE DALLY TALKING TO MR. EDISON 70' from Horn
TROLLEY CAR, PASSING LAB.
LOAD TAKING INSIDE OF CHEMICAL ROOM.
LAB. MACHINE SHOP DOOR SLAM.
MEN CUTTING STONE BACK OF BAY. BUILD.
LAB, DOOR SLAMMED.
FORD AUTO.
HAMMERING HEAVY TIMBERS IN PAVING YARD.
TROLLEY CAR.
PUMP RUNNING BY CHEMICAL ROOM.

#17.

APR 11 1917

MECHANICALLY SAME AS #14 ONLY 2 PM
WITH 040 STYLUS IN RECORDER #7.
9 AM. FEED.

PRINCIPLE SOUNDS:-

WAGON IN STREET.
TROLLEY CAR, ABOUT 1/2 WAY OVER.
AUTO DOOR SLAMMED.
AUTO HORN ON END.

APR 18 1917

#18.

1st trial.

TUNING RECORDED FROM DISC RECORD
TO CYLINDER.

.008 NEEDLE IN RECORDER *2A.

HORNS - 13 + 14.

CYLINDER RUNNING 100 R.P.M.

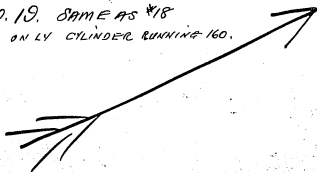
WITHOUT SHUTTER.



2ND TRIAL
SAME AS 1ST, ONLY WITH SHUTTER.

NO. 19. SAME AS #18

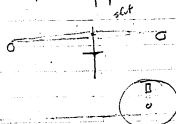
ON LV CYLINDER RUNNING 160.



Notes -

APR 18 1917

Werner - Use tuning record &
duplicate it strongly on the cylinder
by your duplicating funnel



But use a shutter revolving 3 times as
fast as the cylinder 480 Rev

There is a slit near end + inch wide
which ~~lets~~ ^{lets} sound for an instant
pass -

I want to find if record stops suddenly
or continues a little after sound cuts off

Thus
Change to
Edison +
Nipper
184

or

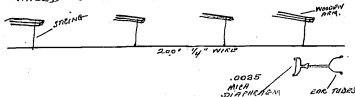


Bally - get sheet No 4 of metal iron wire, should I cut it on hang on strings - put over sound & was listening tubes - scratch the other end - also wind end along for 6" 3 or 4 inches use Ray & Gullery make etc.
Etc

APR 17 1917

APR 23 1917

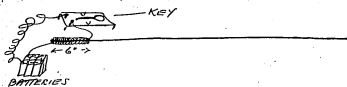
SUSPENDED 200 ft. $\frac{1}{4}$ " IRON WIRE ALONG LAB. FENCE, FROM WOODEN ARMS NAILED TO FENCE. WIRE HUNG BY STRING



SCRATCHED END OF WIRE WITH ORDINARY PIN AND COULD HEAR IT VERY PLAINLY AT OTHER END. BY PLACING DIAPHRAGM WITH EAR TUBES, AGAINST OTHER END OF WIRE.

WOUND END OF $\frac{1}{4}$ " WIRE WITH SINGLE COATED COPPER, .042 COPPER WIRE, 3 LAYERS, 4 OR 6", CONNECTED WITH TELEGRAPH KEY BATTERY. COULD HEAR DOTS VERY PLAINLY AT OTHER

END OF WIRE, BY EAR TUBES & DIAPHRAGM.



APR 27 1917

3 LAYER COIL OF .042 (SINGLE COATED COPPER) WIRE, $\frac{3}{4}$ " HOLLOW CORE. N
HELD THIS COIL OVER END OF 200' $\frac{1}{4}$ " IRON WIRE, CONNECTED WITH KEY BATTERY.
DOTS PLAINLY HEARD AT OTHER END OF WIRE. THEN DIAPHRAGM & EAR TUBES.

($\frac{1}{4}$ " WIRE REMOVED FOR NEW FENCE CONSTRUCTION.)
4/27/17 A.M.

INSIDE OF COIL NOT TOUCHING $\frac{1}{4}$ " WIRE.

APR 27 1917

TRIED ABOVE COIL, WITH $\frac{1}{4}$ " WIRE ON THE GROUND, 6 DRY CELLS. COULD HEAR IT, BUT MUCH WEAKER THAN SUSPENDED.

1 + 2 DRY CELLS CAN NOT HEAR

3, 4, 5 ABOUT SAME.

COIL NOT TOUCHING WIRE, (C) (C) COIL
CENTERS IN EITHER END OF COIL WITH
 $\frac{1}{4}$ " HOLE IN THEM.



(113)

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**Notebook Series -- Notebooks by Edison and Other Experimenters
Recorder and Recording Experiments -- Miscellaneous Books
Notebook, N-15-08-02.1**

This notebook was used during August 1915-July 1916 by Absalom M. Kennedy as a record of experiments with phonograph recorders. Each entry contains the number of the recorder, ranging from 52 through 134, along with comments about components such as head, diaphragm, arm, and sapphire needle and the type of disc used. Edison's opinions about the quality and loudness of the recordings are occasionally mentioned in Kennedy's notes. Inserted into the book is a communication from Kennedy requesting permission to teach employee E. Rowland Dawson how to make stretched recorders, along with Edison's affirmative response. The front cover is labeled "Record of Recorders." The pages are unnumbered, and at least one page has been removed from the book. Approximately 75 pages have been used.

- Record #52 -

Brass Head - Knife Edge Pattern
1 1/2" diameter.

Diaphragm of Japanese Paper,
.001" thick - given 2 thin coats
of shellac - & increasing thickness
to .001 1/2"

Tried first with T arm direct
to diaphragm. Too much
surface and not very loud.

Next shellacked an aluminum
disc 5/8" x .0035 to center. This
diminished surface & improved
loudness & made trifle more
full.

Recorder #53-
(Made 8-2-15)

Brass Head - Knife Edge Pattern
 $1\frac{1}{4}$ " diameter.

Diaphragm of Japanese Paper
impregnated with #1207 Condensate
Transfer Varnish and dried,
.0025" thick.

Original aluminum disc $7\frac{1}{8} \times .008$
removed.

Regular aluminum arm and
.008" sapphire.

Recorder #66.

Brass Head. Domed Top. Knife
Edge Pattern. $1\frac{1}{4}$ " diameter.

Diaphragm of Paper. Paper .001"
given 2 thin coats of shellac &
dried bringing up to .0015".

Cork cone $\frac{3}{4}$ " x $\frac{1}{16}$ " on outside,
shellacked diaphragm and
cone and diaphragm given
4 coats of shellac & dried.

Required aluminum arm
and .003" sapphire.

Recorder #70.

Brass Head; Knife Edge Pattern
 $1\frac{1}{4}$ " diameter.

Diaphragm of Japanese Paper
.001" thick, given 2 thin coats
shellac & dried to .0015" thick.

Cork Cone $\frac{1}{16}$ " x $\frac{1}{16}$ " shellacked to
outside of Diaphragm. Cone
and diaphragm given 4 coats
shellac.

Regular aluminum arm and
.008" sapphire.

Recorder #54.

Brass & lead. Domes Tap.
Knife Edge Pattern. $1\frac{1}{2}$ " diameter.

Diaphragm of Japanese Paper
001" given 2 thin coats of
shells & made to .0015".

Cork cone $\frac{3}{4}$ " & $\frac{1}{16}$ " shellacked to
inside of diaphragm. Cone
and diaphragm given 4 coats
shells.

T shaped Walter Miller arm
and regular 008" sapphire

Recorder #59.

Brass lead. Domed Top.
Knife Edge Pattern, $1/16$ " diameter.

Diaphragm of Japanese Paper
.001" given 2 thin coats of
shellac and brought up to
.0015".


Cork Cone $3/4 \times 1/16$ " shellacked to
inside of diaphragm. Cone
and diaphragm given 4 coats
of shellac.

Regular aluminum arm and
.008" sapphire.

Recorder #70 *Made over*

Brass Head. Knife Edge Pattern
 $1\frac{1}{4}$ " diameter.

Diaphragm of new Japanese
paper .0007" thick wet with
alcohol and given 2 thin coats
shellac & dried .001" thick.

Cork cone  $\frac{1}{16}$ " $\frac{1}{32}$ " coated
with shellac all over &
shellacked to diaphragm.

Turned aluminum arm
spliced to knife edge with
shellac. Regular 800" sapphire

70-3415-
Planoconv

Recorder #65

Brass Head, Domed Top.
Knife Edge Pattern - $1\frac{1}{4}$ " diameter.

Diaphragm of new Japanese
Paper - .0007" thick - wetted
with alcohol and given 2
thin coats of shellac.

Cork cone  coated

with shellac all over &
shellacked to diaphragm.

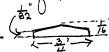
Tapered aluminum arm
fastened to knife edge
with shellac

Regular .008" sapphire.

Record #66.

Brass/Lead - Domed Tap -
Knife Edge Pattern - $1\frac{1}{4}$ " diam.

Diaphragm of new Japanese
Paper - .0007" thick - wetted
with alcohol and given 2
thin coats of shellac.

Cork cone  coated

with shellac all over and
shellacked to diaphragm.


Tapered aluminum arm
fastened to knife edge with
shellac.

Regular .008" sapphire.

Recorder #73.

Brass head, Knife Edge Pattern
1 1/4" diameter.

Diaphragm of new Japanese
paper, .0007" thick - etched
with alcohol and given 2
thin coats of shellac.

Cork cone  1/8" coated
with shellac on both sides
and shellacked to diaphragm.

Tapered aluminum arm,
shellacked to knife edge
Regular .008" sapphire.

70

Brass Head. Knife Edge Pattern
 $1\frac{1}{4}$ " diameter.

Diaphragm of New Japanese
Paper .007" thick - wetted with
alcohol and given 2 coats of
shellac.

Aluminum Disc .003" $\pm \frac{1}{4}$ "
phased to center.

Tapered aluminum arm and
.008" Sapphire.

M. E " Blues" - 80% loud.

#73

Brass lead. Knife Edge Pattern
1 1/4" diameter.

Diaphragm of New Japanese Paper
.0007" thick - Jewelled with alcohols
and given 2 coats (thin) shellac.

Aluminum disc .003" x 1/4"
shellacked to center.

Tapered aluminum arm
and .008" sapphire.

Tapered aluminum arm
and .008" sapphire.

Mr. E says "Blubs" -

#55

Brass v-head domed Tap.
Knife Edge Pattern - $1/16$ " diameter.

Diaphragm of new Japanese
Paper .0007" thick - wetted with
alcohol and given 2 coats of
thin shellac.

Aluminum disc $1' \times .0015$ " shellacked
to diaphragm at center.

Tapered aluminum arm
shellacked to diaphragm .008"
Sapphire

Mr. E. Gino -
Quality 75%
Sound 80%

#57-

Brass head. Knife Edge
Pattern - $1\frac{1}{4}$ " diameter.

Diaphragm of Japanese Paper
.0007" thick - Jetted with
alcohol and given 2 thin
Coats shellac.

Aluminum disc $1\frac{1}{4}$.0015"
shellacked to center of
diaphragm.

Tapered aluminum arm
waxed to edge of
diaphragm. .008" capillary

Mr. E gives Pond 110% }
Quality 115% }

no compound used
#57.

#54-

Grass Head, Domed Tap.
Knife Edge Pattern - 1/4" diam.

Diaphragm of New Japanese
Paper .0004" thick, impregnated
with alcohols and given 2
thin coats of shellac.

Mica Disc .0025" x 1"
shellacked to center of
diaphragm

Tapered Aluminum arm
welded to edge of
diaphragm.

M. E. gives Load 80%
Load 75%.

#73

Brass Head - Knife Edge Pattern.
1 1/4" diameter.

Diaphragm of New Japanese Paper
.0007" thick - Dipped with alaskal
and given 9 thin coats of shellac.

Aluminum Disc 1" x .0015" shellacked
to center.

Tapered aluminum arm shellacked
to edge of diaphragm.

.008" sapphire.

Mr. E. Camp "Scratches"

#70

Brass Head. Knife Edge Pattern
1 1/4" diameter.

Diaphragm of new Japanese
Takui-.0007" thick, wetted with
alcohol and given 2 thin coats
of shellac.

Aluminum disc on center
(shellacked) 1 1/8" x .0015".

Tapered aluminum arms, raised
to edge of Diaphragm

.008" thick.

Mr E Larp "Rent 70"
"Dial 80"

#55

Brass Head, Domed Top,
Knife Edge Pattern - $1\frac{1}{2}$ " diam.

Diaphragm of new Japanese
Paper - .0007" thick - coated
with asphalt and given a
thin coat of shellac.

Softened Aluminum Disc
1" 2.0015" - flared to center -

Tapered aluminum arm
sharpened to edge of diaphragm
0.08" cap thickness.

Mm. Equip "Head 75"
"Base 75"

#5L

Brass Head-Domed Top-Knife
Edge Pattern - $1\frac{1}{4}$ " diameter.

Diaphragm of new Japanese
Paper - .0007" thick - milled
with needle and given V
thin coils of shellac

Aluminum Disc $1\frac{1}{4}$ x .0015"
Shellacked to center.

Tapered aluminum arm,
shellacked back of Knife Edge
as per directions Mr. E.

.008" sapphire.

Mr. E says "Ground too deep
or rounded scratches"

#66

Brass head - Domed Top - Knife
Edge Pattern - $1\frac{1}{4}$ " diameter.

Diaphragm of new Japanese
Paper - .0007" thick & mottled
with alcohol and given
2 thin coats of Shellac

Softened Aluminum Disc
 $1\frac{1}{2}$ x .0015" Shellacked to center.

Tapered aluminum arm
shellacked to edge of
diaphragm.

.008" sapphire.

Mr. E says "nearly as good as
of but a little scratchy"

65

Brass Head - domed Top - Knife
Edge Pattern - $1\frac{1}{4}$ " diameter.

Diaphragm of new Japanese
Paper .007" thick, wetted with
alcohol and given 2 thin coats
of shellac.

Special aluminum disc-dome

set column, shellacked.



made of .0015" aluminum.

Tapered aluminum arm, shellacked
behind knife edge.

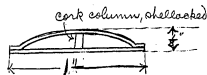
.008" sapphire.

#75-

Brass Head - Knife Edge Pattern
1 1/4" diameter.

Diaphragm of new Japanese
Paper - .0007" thick, wetted with
alcohol and given 2 thin coats
of shellac.

Special aluminum disc-dome



made of .0025" sheet aluminum.

Tapered aluminum arm, shellacked
behind knife edge.

.008" sapphire,

765 19a

#76
Grass Head. Knife Edge
Pattern - $1\frac{1}{4}$ " diameter

Diaphragm of new Japanese paper
.007" thick, wetted with alcohol
and given 2 thin coats of
shellac

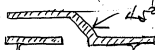
Aluminum disc .0025" x 1"
shellacked to center of diaphragm

Tapered aluminum arm
shellacked behind knife edge.

.008" sapphire

#79

Brass Head - Knife Edge Pattern



with 45° face in tube.
1 1/4" diameter.

Diaphragm of ^{new} Japanese Paper
.0007" thick wetted with alcohol
and given 2 thin coats of
shellac.

Aluminum Disc .0025 x 1"
shellacked to center of
diaphragm.

Tapered aluminum arm
shellacked behind knife edge

.008" Sapphire.

999 Purity
100 Purity
w/anneal vacuum
as in all others
insulating 5007-

TIGHTENED
Pans 75%
Purity 75%

#74-

Brass Head - Knife Edge
Pattern - $1\frac{1}{4}$ " diameter.
Top shaped as shown



Diaphragm of New Japanese
Paper .0007" thick, wetted with
alcohol and given two thin
coats of shellac.

Aluminum Disc .0025" x 1"
Shellacked to center of diaphragm.

Tapered aluminum arm shellacked
behind knife edge.

.008" sapphire.

{ Load 80% }
{ Stud 70% }

#77

Brass Head - Knife Edge Pattern
1 1/4" diameter.

Diaphragm of new Japanese
Paper .0067" thick, wetted with
alcohol & given 2 coats of
shellac.

Aluminum disc .0025" x 1"
shellacked to center of
diaphragm.

Tapered aluminum arm with
foot shellacked behind knife
edge

.008" sapphire -

1974/11

78.

Brass Head - Knife Edge Pattern
1 1/4" diameter.

Diaphragm of New Japanese Paper
.0007" thick, buttered with alcohol
and given 2 coats of shellac.

Aluminum disc 1 1/16 x .0015"
shellacked to center of diaphragm.

Tapered aluminum arm
with ~~flat~~ shellacked behind
knife edge.

.008" sapphire.

10/14/50

#71

Brass Head - Knife Edge Pattern
1 1/4" diameter.

Diaphragm of new Japanese Paper
.0007" thick, wetted with alcohol
and given 2 coats of shellac.

aluminum disc, .0015" x 1 1/16"
shellacked to center of diaphragm

Tapered aluminum arm,
with tail shellacked behind
knife edge.

.008" sapphire

12/15/15

#65

Brass Quad-Knife Edge Pattern
Domes Top - $1\frac{1}{8}$ " diameter.

Diaphragm of New-Japanese
Paper .007" thick, wetted with
alcohol and given coats
of shellac.

Aluminum Disc .005" x $1\frac{1}{16}$ "
shellacked to center of diaphragm

Tapered aluminum arm which
tail shellacked behind knife edge.

.008" sapphire.

10/15/15-

#75.

Brass Head-Knife Edge Pattern
1 1/4" diameter

Diaphragm of New Japanese
Paper .0067" thick wetted with
alcohol and given 2 coats of
shellac.

Aluminum Disc 1 5/8" x .0015"
shellacked to center of
diaphragm.

Tapered aluminum arm
tail shellacked behind knife
edge

.008" sapphire.

12/15/15

#77.

Brass Head - Knife Edge
Pattern - $1\frac{1}{4}$ " diameter. - 45° back

Diaphragm of New Japanese
Paper .0007" thick, milled
with alcohol and given
2 coats of shellac.

Aluminum Disc $\frac{15}{16}$ " x .001"
Shellacked to center of
diaphragm.

Tapered aluminum arm,
tail shellacked behind knife
edge.

.008" sapphire.

12/16/5

#78

Brass Head - Knife Edge Pattern
1 1/4" diameter - 45° Back.

Diaphragm of New Japanese
Paper .0007" thick, milled
with alcohol and given 2
coats of Shellac.

Aluminum Disc $\frac{5}{16}$ " x .001"
Shellacked to center of
diaphragm.

Tapered aluminum arm,
tail shellacked behind knife
edge.

.008" sapphire

12/16/15.

#79

Brass Head - Knife Edge Pattern
 $1\frac{1}{4}$ " diameter - 45° Back.

Diaphragm of New Japanese
Paper .0007" thick thick, sweetened
with alcohol and given 2
coats of shellac.

Mica disc $\frac{15}{16} \times .0012$ " shellacked
to center of diaphragm.

Tapered aluminum arm,
tail shellacked behind knife
edge.

.008" sapphire.

#54.

Brass Head. Domed Top
Knife Edge Pattern - $1\frac{1}{4}$ " diameter.

Diaphragm of New Japanese Paper
0007. Thick, knitted with alcohol
and given 2 coats of shellac.

Aluminum Disc $\frac{1}{16}$ " \times .0015" .
Shellacked to center

Tapered aluminum arm - tail
shellacked behind knife edge.

.008" sapphire.

#65

Brass Head - Tapered Tube - Domed
Head - Knife Edge Pattern - $1\frac{1}{4}$ " diam.

Diaphragm of new Japanese Paper
.0007" thick - dipped with alcohol and
given 2 thin coats of shellac.

Aluminum Disc of ".0015" shellacked
to center of diaphragm.

Tapered aluminum arm - tail
shellacked behind knife edge.

.008" sapphire.

Accept as
Standard

#66

Brass Head - Tapered Tube - Domes Head
Knife Edge Pattern - $1/4$ " diameter.

Diaphragm of New Japanese Paper
.0007" thick - dipped with alcohol
and given 3 thin coats of phellac.

Aluminum Disc $\frac{7}{16}$ " x .0015" phellacked
to center of diaphragm.

Tapered aluminum arm
phellacked behind knife edge.

.008" sapphire.

12/27/14-

64

Brass Head - Tapered Tube -
Domed Head - Knife Edge Pattern
1/4" diameter.

Diaphragm of new Japanese
Paper .0007" thick - wetted with
alcohol and given 2 thin coats
of shellac bringing it to
about .001".

Aluminum Disc $\frac{7}{8}$ " \times .0015"
shellacked to center of
diaphragm.

Tapered Aluminum arm
shellacked behind knife edge
.008" sapphire.

1967/15.

75

Brass Head. Knife Edge Pattern
1/4" diameter.

Diaphragm of Old Japanese
Paper .001" thick putted with
alcohol, given 2 thin coats of
shellac, dried and given 2
more thin coats bringing
thickness to about .0015"

Aluminum disc $\frac{7}{8}$ " x .0015"
shellacked to center of
diaphragm.

Tapered aluminum from
shellacked behind knife
edge.

.008" ca. pphire.

17/27/5

#66

Brass Head. Knife Edge Pattern
 $1/4$ " diameter - Tapered Tube Banded
Head.

Diaphragm of Old Japanese Paper
.001" thick, wetted with alcohol,
given 2 thin coats of shellac,
dried and given 2 more thin
coats bringing thickness to between
.0015 and .002".

aluminum disc $7/8$ " x .0015"
shellacked to center of
diaphragm.

Tapered aluminum arm
shellacked behind knife edge.
.003" sapphire.

#55

Brass & lead - Domed Tap
Knife Edge Pattern - $1\frac{1}{4}$ " diameter,

Diaphragm of old Japanese Paper
.001" thick - wetted with alcohol
given 2 thin coats of shellac,
dried and given 7 additional
thin coats of shellac bringing
thickness to between .005 and .002"

Aluminum disc $\frac{7}{8}$ " \times .0015"
shellacked to center of
diaphragm.

Tapered aluminum arm
shellacked behind knife edge.

.008" sapphire.

Reorder #132

Head 1" - Domes Gap.

Diaphragm - Jap. Paper - 9 coats shellac
.0015" - reticulated before applied.

Disc aluminum $\frac{7}{8}$ " .0015"

Arm Support Al. cone $\frac{7}{8}$ " diam - $\frac{1}{8}$ " high of
.0015" oak, center support of
ball of cotton & wax.

Sapphire Arm - Special - Papered - .0003"
aluminum, stuffed with
cotton. Mounted with silk
thread.

Sapphire Regular .000"

Remarks - On instrumental records -

Violin, Piano etc. This
gave best results to 41/16.

Surface good. Starts soft
at horn better than any. Harder
than #100. Shows excellent
definition.

Reorder #129.
4/4/16.

Head - 1" diameter - Banded Top.
Diaphragm. Pap. Paper, 8 coats phellac. .0015".
Etched before applied.

Disc, Aluminum $\frac{7}{8}$ " .0015"

Arm Support. Al. Cone $\frac{1}{8}$ " diam. $\frac{1}{8}$ " high of
.0015" stock, center support of
cotton & wax.

Sapphire Arm Special Exposed .002 .008" al. stuffed
with cotton. Mount with silk thread.
Sapphire Regular 00-8.

Reverdin #131.

Head - 1" diameter. Domes Top.

Diaphragm - Jap. Paper. Resists phosac. .0015" stretched before applied. $\frac{3}{16}$ " hole in center

Disc - aluminum $\frac{3}{16}$ " x .0015"; phellacked concentric with $\frac{3}{16}$ " hole in diaphragm.

Firm Support - Al. Cone $\frac{3}{16}$ " diameter, $\frac{1}{8}$ " high of .0015" stock, center support of cotton and wax.

Sapphire Arm - Special; Tapered - of .008" Al. stuffed with cotton wound with Oak thread.

Sapphire - .008" - Regular.

Reorder # 102.

- Head - 1" diameter. Bone Top.
Diaphragm - Jap. Paper. Dipped in #1207 Condensite
Transfer Varnish & Dried (about 3 mos)
.0025" thick.
Disc - Aluminum. $\frac{5}{8}$ " x .0015"
Arm Support - Al. Cone $\frac{3}{8}$ " diameter - $\frac{1}{8}$ " high of
.0015" stock, center support had of
cotton & wax.
Sapphire Arm - Special Papered. of .008" stock
stuffed with cotton & wax
with thread.
Sapphire Regular .008"

Remarks - Dawson Reports "Marginality
& seems firmer to me than others.
Think it would stand more
punching if necessary. Surface
O.K.

All 3 of us thought it weaker
in volume than 132 but light
shows it infinitely louder
than 132 or 131! Doesn't seem
full either. Very clean &
nice.

5/29/16.
Reorder #107

Head
Diaphragm

1" diam. domed top.
Skin from Mrs. Maguire,
2701 Archer Ave., Chicago.
.0125" thick. Stretched on
supplemental stretch before
applied.

Disc

Aluminum, domed, pressed
and tempered in die. $\frac{7}{8}$ "
diameter, domed $\frac{1}{16}$ " high
of .0015" stock.

Sapphire
Arm.

Special - tapered - of .008" stock
stuffed with cotton & wound
with silk thread.

Sapphire

Regular .008".

5/29/16
#104

Head
Diaphragm

1" diameter, Domed Top
Skin, from Mrs. Margerlein,
2701 Archer St., Chicago.
.0015" thick stretched on
supplemental stretchers before
applying.

Disc

Aluminum, .0010" stock, domed
pressed, stamped in die,
1/8" high - 5/8" diameter.

Sapphire
Arm

Spindle, tapered, of .008"
aluminum stock, stuffed
with cotton & wound with
silk thread.

Sapphire

Regular .008"

#104 - Tested 7/8/16.
Meak felt firm true and
natural. Only about 80%
as loud as #100.

7/11/16 Mr. E tested. "Meaker
than 192".

7/7/16

#104 - ✓
Brass Head - 1" diam. Remed
Top. Knife Edge Pattern.

Diaphragm of 3 thicknesses
of Jap tissue - shellacked
and pressed bet 10.00 & 3".

Aluminum Core - pressed
of 2.5-15" Jock - 5/8" diameter,
1/8" high with waxed cotton
plug at center.

Aluminum arm of .008" stock
Tapered, stuffed with cotton
and wound with silk cord.

Regular .008" sapphire. Ex-
amined under microscope
shows smooth edge slightly
coarsened on outside and
slightly tapered.

#127 Tested 7/10/16. Loud and very full but natural for violin. Will test further to confirm.

7/11/16 Mr. E. tested. Loud and better on piano than 132 - too sensitive & blinks on violin. Try further back with violin.

7/10/16.

#127[✓] - Brass Head, Domes Taps.
1" diameter. Knife Edge Pattern.

Diaphragm of 2 thicknesses of Jap. Tissue - phellacked and not pressed to 002".

Aluminum Cone pressed of .0015" stock - 5/8" diameter, 1/8" high with waxed cotton plug at center. Rued on top

Aluminum arm of .008" stock, tapered, stuffed with cotton and wound with sick cord. no feet

Regular .008" sapphire.
Examined under microscope shows taper and slight corking at edges.

7/11/16
#115 - Brass Head, Dome Top. $\frac{1}{8}$ " diam.
Knife Edge Pattern.

Diaphragm - 1 thickness of
chilled Jap. paper .00125" -
healed & stretched before being
pressed down as diaphragm.

Aluminum cone of .0015" took
 $\frac{1}{8}$ " diam. $\frac{1}{8}$ " high pressed.
Naked cotton plug in center,
roll on top.

Aluminum arm .0008" thick
tapered - no foot.

Regular .008" sapphire. Exam-
ination with microscope
shows this straight (without
taper).

7/11/16

✓
#107- Brass Head - Domes Tap -
1" diameter - Knife Edge Pattern.

Diaphragm - 2 thicknesses of
standard shellacked gap paper
as used in Disc Reproducers,
.002 1/2" thick - heat pressed.

Aluminum cone of .0015" stock
5/8" diameter - 1/8" high with
roller on top.

Tapered aluminum arm,
no foot. Stuffed with
cotton, and wound with
Silk Thread.

Regular .008" sapphire. Ex-
-amined under microscope
showed that it was tapered
and had a corked edge -
smooth but dulled.

#117 -

7/12/16

Brass Head - $\frac{1}{8}$ " diameter -
Dome Top. Knife Edge Pattern.

Diaphragm 1 thickness Jap Paper
shredded - .00125" thick - heated
& stretched before being screwed
down

Aluminum cone of .0015" stock -
 $\frac{1}{2}$ " diam - $\frac{1}{2}$ " high - wired cotton
plug in center.

Aluminum arm of .008" stock
tapers - stuffed with cotton -
no fast.

Regular .008" sapphire. Examined
under microscope shows
straight but with curved
edge - not very sharp.

7/12/16.

#131- Brass Head - 1" diameter -
Domed Top - Knife Edge Pattern.

Diaphragm - 2 thicknesses of
Gap paper, heated and pressed
to .002".

Aluminum cone of .0015" stock,
5/8" diameter - 1/8" high - waxed
cotton plug in center.

Aluminum arm of .008" stock
tapered, stuffed with cotton and
wound with silk thread.

Regular .008" sapphire. Examined
under microscope shows
somewhat tapered and corked -
not very sharp.

7/14/16

#120 - Brass head - $\frac{1}{4}$ " diameter,
domed top - knife edge pattern.

Diaphragm - thickness .002",
tissue, shellacked .002", pretreated
and heated before being screwed
down.

Aluminum cone of .0015" stock,
 $\frac{1}{2}$ " diameter - $\frac{1}{8}$ " high, waxed
cotton plug in center

Aluminum arm of .008" stock,
tapered - no feet - stuffed
with cotton (roller between
arm and cone.

Regular .008" sapphire. As
arrived under microscope
shows straight - slightly corked.

7/14/16

#102 - Brass Head - 1" diam. domed
Top - Knife Edge Pattern.

Diaphragm - thickness of
shallapic paper tissue - covered
with lead .005" thick. $\frac{7}{16}$ " hole
cut in center.

Domed of aluminum - .005" stock
 $\frac{7}{16}$ " diameter - $\frac{1}{8}$ " high with
roller waxed on top.

Aluminum arm - .008" stock
annealed - tapered - no feet -
stuffed with cotton.

Regular .008" sapphire. Under
microscope shows that it
has been worked.

Weak & slight patters

7/14/16

#134 ✓ Brass head - Special angle rubber
domed - 1" effective

Diaphragm of mica .001"

Dome - aluminum - .0015" stock
of 8" diameter, 8" high with
roller on top - cotton & wax
center plug.

~~Aluminum - .008" stock,
tapered to foot - stuffed
with cotton~~

Regular .001" sapphire. Micro-
scope shows straight and
only slightly corked

#132 - 7/7/16

Better than before - About as loud
as 132 - not as firm & true. Used
on piano. Louder than 132.

7/15/16.

#134 - Brass head - Special angle Peilkes
- domed - 1" effective diameter.

Diaphragm of mica -.0007".
1/8 hole cut out in center and
magnesium disc .002 x 5/8" used
on.

Cone of .006 aluminum - 5/16" diam
x 7/64" high.

Aluminum arm of .008" stock
tapered - no feet - stuffed
with cotton.

Regular .008" sapphire.
Microscope shows straight
and slightly curved.

#109- 7/17/16.

Very loud - 50% louder than
132. Very full - too full - blubs
with on biblin and on loud
piano.

7/17/16

#109. Brass head - 1" diameter -
Domed - knife edge pattern.

Diaphragm - Jap paper shellac
and stretched $7/8$ " hole cut in,
.0015" thick. Brass disc
.001" x $7/8$ " shellac to paper
ring.

Cone of aluminum, .006"
thick - $3/8$ " diameter, $7/16$ "
high waxed on.

Arm of aluminum - .008" thick,
tapered, stuffed with cotton,
& wound with thread.

Regular .008" cork piece.
Extremities under microscope
shows straight & hole &
no corking.

tested 7/18/16. Powder Kan 132
big - full - stands out.

7/18/16

#121- Brass Head - 1" diameter -
Domed Top - Knife edge pattern.

Diaphragm of Japanese
paper, 1 coat Shellac, stretched.
Hole $\frac{7}{8}$ " diameter cut out
and mica disc $\frac{15}{16}$ " x .001"
shellacked over.

Dome of aluminum - $\frac{7}{8}$ "
diameter x $\frac{1}{8}$ " high of .0015"
stock. Roller on top.

Arm of .008" aluminum,
tapered & fluffed with cotton.

Regular .008" sapphire. Spheres
round & but slightly curved.

Tested 7/8/16. Louder than #132
Bigger & fuller but not quite as
big's full as #121.

7/18/16

#113 - Brass Head - 1" Diameter - Domed
Tap - Ringer Type Pattern.

Diaphragm of Japanese Paper, 12 cut
shellac & dried. Stretched. Hole $\frac{7}{8}$ "
diameter cut in center. Mass disc
 $\frac{1}{16} \times .001$ shellacked over.

Disc of aluminum $\frac{5}{16} \times .0015$
waved over center. Small triangular
support for arm.

Aluminum arm of .008" stock,
tapered & stuffed with cotton.

Regular old opphire. Shows
tapered & evidence of beingarked.

7/19/16 - Absent as loud as
137 - fuller & bigger but
not quite as clean & sharp

7/19/16

#126 - Brass head - 1" diameter
Domed Top. Knife Edge Pattern.

Diaphragm of Japanese Paper,
1000 sheets - .00125" - stretched.
Hole $\frac{7}{8}$ " diameter cut in center
over which was stretched
a disc of mica $\frac{5}{16} \times .00125$

Magnesium disc $\frac{7}{8} \times .002$
waxed to center of mica.
Arm supported by triangular
piece $\frac{7}{8}$ " base & $\frac{1}{8}$ " high.

Arm of .005" aluminum,
tapered - no feet - stuffed
with cotton.

Regular 504" sapphire. Shows
straight - slightly if at all
cracked - slight marks.

7/20/16 - Turned sapphire. Shows good
wt.

#128 - 7/19/16. Shows about
as loud as 132. Shellers
higher than 136 & does not
hold as well. About as
big as #113.

#128 - Brass Head - 1" diameter -
Domed Top. Knife Edge Pattern.

Diaphragm of Japanese Paper,
1 coat shellac 200/25" stretched.
Hole $\frac{7}{16}$ " diameter cut in center
over which shellacked a disc
of mica $\frac{7}{16} \times .001$ "

Magnesium disc $\frac{7}{8} \times .001$ " was set
to center of mica. Arm
supported by triangular
piece of .008" aluminum
 $\frac{1}{8} \times \frac{1}{8}$ base $\times \frac{1}{8}$ " high.

Arm of .008" aluminum,
tapered to foot. Stuffed with
cotton.

Regular .008" sapphirine. Shows
straight - mark on right side.

7/28/16 Turned Sapphirine. Shows better
rough - slight marks on cutting edge.

7/30/16 - Tested. Not quite as
loud 132 - not as firm &
clean - more of the mica
note quality - this disc like.

7/20/16.

#106 - Brass Head - 1" diameter - deep
domed top - Knife Edge Pattern.

Diaphragm of Jap. Paper,
1 coat shellac - stretched, .00125
disc $\frac{7}{8}$ " diameter cut in
center - $1\frac{5}{16} \times .002$ " mos.
disc shellacked over.

Disc of Aluminum $\frac{7}{8} \times .0015$
waxed to center, with triangular
support of aluminum $\frac{1}{8} \times \frac{1}{8}$
base $\frac{1}{8}$ " high - for arm.

Aluminum arm of 308 stock
tapered - no foot - stuffed with
cotton.

Regular .009" Sapphire. Seems
straight & slightly curved.

#105- 7/21/16 - not as loud as
131 - true & clean.

7/21/16.

#105 - Brass head - Sometop.
Knife Edge Pattern - 1" diameter.

Diaphragm of 2 thicknesses
of Jap tissue, shellacked
& pressed with heat .0015".

Disc of Magnesium .002"
x $\frac{5}{8}$ " diameter, triangular
aluminum support for
arm $\frac{1}{8}$ x $\frac{1}{8}$ " base x $\frac{1}{8}$ " high.

Arm of .008" aluminum,
tapered bluffed with cotton.
no foot.

Regular .003" of plate. Arms
straight and not bent
as noted.

Rotten

Very Neat

7/28/16

#114 - Brass Head - Flat top - 1" diam.
Knife Edge Pattern -

~~Brass~~ Magn. - two thicknesses of
sheet metal - wheellock - .005"
nick lines & pressed together.

~~Disc of Magnesium - .002"
x $\frac{5}{8}$ " Regular w. 10 feet
in opposite diam. $\frac{1}{8}$ x $\frac{1}{8}$
base of $\frac{1}{4}$ x $\frac{1}{4}$ of .005"
aluminum.~~

Arm of .005" aluminum,
tapered, with $\frac{1}{4}$ " with cotton
screws with thread. No feet.

Regular .005" copper wire.
Shows straight & little if
any coiled. Small mark on
left side.

#127 Neck x lot of
Surface.

7/25/16

#122-

Brass head - domed top - 1" diam.
Knife Edge Pattern.

Diaphragm of gap paper,
1 coat shellac .00025". 7/8 hole
cut in center over which is
shelocked an aluminum disc
 $\frac{5}{16} \times .0015$ (spring). A triangular
support $\frac{1}{8} \times \frac{1}{8}$ base $\times \frac{1}{8}$ high for
arm of .008" aluminum is
wired to center.

Diagram

Arm of .008" aluminum - tapered
no feet - ~~stuffed with cotton~~
secured with thread
Regular .008" sapphire. Examined
shows straight and not little
if any curved.

#114- Pattern - full of surface
and very weak-

7/25/16

#114- Brass Dead-Flat top - 1" diam.
Knife Edge Pattern.

Diaphragm of Jap Paper, 1 coat
shellac - ~~drilled~~ - .00125"
7/8" hole cut in center over
which was shellacked an
aluminum disc $\frac{1}{16}$ " x .001".
Triangular support for arm
of .008 aluminum $\frac{1}{8}$ " x $\frac{1}{8}$ " base x $\frac{1}{8}$ "
high.

Arm of .008" aluminum, tapered
filled with carbon, secured
with thread. no fast.

Regular .008" sapphire. Shows
slight mark. Seems straight
rather if any curved.

#114 - Heavy surface &
weak.

7/26/16

#114 - Made over as before but
with good sapphire -
shows clean cuts.

Something peculiar here. Worth
study as to relative advantages
of flat & domed heads.

Turn up

#110

Fuller than 12Y - nearly
as full as 13Y but had
surface & noisy. Firm
shells well.

7/26/16

#110-

Brass Head-Domed Tap - 1" diam.
Knife Edge Pattern.

Diaphragm of shellacked flap
paper. Shellacked .00125" flap
with $7/8$ " hole cut out of
center over which a $1/16$ " x .001"
spring aluminum disc
is shellacked. Triangular
support for arm of .008"
aluminum, $1/8$ " x $1/8$ " base x $1/8$ " high.

Arm up

Arm of .008" aluminum,
tapered, drilled with
center - no fast.

Regular .008" or .009" p.p.h.s. Shows
some what to pores & soaked.

7/27/16.

#114 - Brass Head Flat top - 1" diam.
Knife Edge Pattern.

Diaphragm of Jap Paper,
shredded - stretched, .00125"
 $\frac{7}{8}$ " hole cut from center and
which is shredded a $\frac{1}{8}$ " x .001"
aluminum disc.

Aluminum disc $\frac{9}{16}$ " x .001"
waxed to center. Triangular
arm support of .008"
aluminum, $\frac{1}{8}$ " x $\frac{1}{8}$ " base x $\frac{1}{8}$ "
high.

Arm of .008" aluminum,
tapered - no foot

Regular .008" sapphire. Show
slight but has marks
which have been turned
away from cutting edge.
Poor - pulverized chip.

7/27/16.

#110 - Brass Head - Domed Top. 1" diam.
Knife Edge Pattern.

Diaphragm of Jap Paper, shellacked
-.00125 - stretched. $\frac{7}{8}$ " hole
cut in center over which is
shellacked an aluminum disc
 $\frac{1}{16}$ " \times .001"

aluminum disc $\frac{7}{8}$ " \times .001" raised
to center. Triangular arm
support of .008" aluminum
 $\frac{1}{8}$ " \times $\frac{1}{8}$ " base \times $\frac{1}{8}$ " high.

Arm of .008" aluminum, tapered,
no felt.

Regular .008" supports. Shows
somewhat tapered and cocked.

7/27/16

#122 - Brass Head, Domes Top. 1" diam.
Knife Edge Pattern.

Diaphragm of Jap. Paper - post
phylac - .00125" stretched,
7/8" hole cut in center over which
to phylacated an aluminum
disc $\frac{15}{16}$ " x .001".

Aluminum disc $\frac{7}{8}$ " x .001
waxed to center. Arm support
triangular, of aluminum
.008" stock, $\frac{1}{8}$ " x base x $\frac{1}{8}$ " high.

Arm of .008" aluminum - tapered
rounds with thread and stuffed
with cotton. No fast.

Regular .008" sapphire. Examined
shows straight and only
slightly corked if at all.

[ITEM(S) FOUND IN BOOK]

Mr. Edison =
Have 10 more Diamond
Disc Demonstrators to teach
latter part of this week.

Is there any objection
to teaching Dawson to make
stretched records? He can
then get them out faster
and he can continue making
when I can not.

12/6/15.

Am Kennedy

No objections go ahead—

2

[ITEM(S) FOUND IN BOOK]

Inspection - Rynt Sluff

Labels of shells on drop-down
by ripan now

Repairmen tampering
with reproducers

Lacquerings Dept | Brand Marks ² Brand
not supplied.

Clamp & strain

Rubber Stock

[ITEM(S) FOUND IN BOOK]

Paper Cut Sq.
Grated 1 side ~~Shrub~~
mush

Diaphragm Ganged
on ~~Shrub~~ - range

Range Cuffs

500 Repeat

Water ~~but~~ - ~~sub~~ on ~~form~~

Full Sq.

Leather Chasing Links
Sketch App

~~Diaphragm~~ ~~Shrub~~ ~~Link~~

Diaphragm Cut. immediately

**Notebook Series -- Notebooks by Edison and Other Experimenters
Recorder and Recording Experiments -- Miscellaneous Books
Notebook, N-15-11-19**

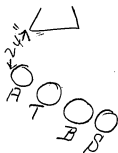
This notebook was used by Edison, Absalom M. Kennedy, and others during November-December 1915 for notes on experimental recordings. The first few entries are by Edison. For subsequent entries, the details of the recording session are provided by Kennedy, E. Rowland Dawson, or other experimenters, with frequent comments by Edison on the quality and loudness of the recordings. Some of the entries include notes or drawings regarding the positions of instruments and voices, as well as the position of the recorder and horn. Others are very brief and include only the identifying number of the recorder or horn and a percentage, usually written by Edison, indicating quality and volume as compared to standard. The front cover is marked "Mr. Edison." The pages are unnumbered. Approximately 130 pages have been used.

66769
Stearns Co.,

MFG. STATIONERS,
96 JOHN ST.
AND
19 PLATT ST.
NEW YORK.

Nov 19, 1915

EXP. VIII CON.

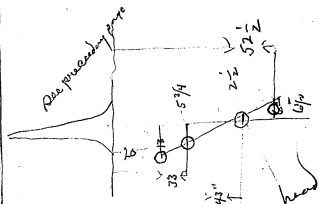


Quartet
2 Horn; Recorder # 62.

X
Pretty fair + loud
Enough for Rec. work
but blubbers + sounds
of Recorder HQ -
Streets Recorder #62

This horn is very mellow no
 Muffled or nasal sounds
 Overtones loud giving clear
 Mellow sounds all musical

This is high water
 mark so far -



po

Quartet
 Horn #2 Recorder #9.

Same arrangement as X
 on preceding page

No change except used

Regular Wallis Mellow
 records

This is best have heard
 yet plenty loud enough
 for Reg desc no
 interference when voices
 balanced it will be
 fine can hear each voice
 even loudest parts

Wallis records
 when any of the four
 attempt voices not so good

good

Continued I put the
~~the~~ beaver board reflection
8 ft wide 8 ft high.

Right close to Rophrams
with previous page
arrangement but
echoes Confused it
because probably tenor
 $\frac{1}{2}$ way between,

to make this work each
singer would have to
have a sounding board

Its better to do away
with them & use
Cow hair

I now substitute Cow
hair partitions for
reflecting board -
Cow hair all around

but floor only has thin
Carpet & walls 15 ft
up are wood

Record is ok & best yet
clear in all parts no
interference, each voice
separate, - When
proper way to balance
Volume is got can
take any record

EXP. IX

We have been using horn A and speaking of it as the standard of regular recording at this time.

Mr. Miller, however, says this horn has been abandoned in his studio.

We therefore had horn made according to his description of the horn he is now using, calling it horn G.

The two are now tested.

Evening Star by Dawson

HORN A

Single 10 inches from horn

Fair to good

HORN G

Walter Miller Standard

Ringier 10 inches from horn

60% of the Volume of

A, + no better —

EXPI.

In Exp 8, when using horn #48
its crooked neck was replaced
by a straight neck in order
to let singers, sing into horn
more conveniently

Mr Edison thought possi-
bly this change may have
affected the quality of horn.

The horn is therefore tested
both ways.

Kathleen Throumneen at
three feet.

HORN 48
WITH STRAIGHT NECK

100%

HORN 48
WITH DUTCHMAN'S PIPE NECK

100% possibly 105

Horn #1

100%

EXP. I CON

HORN TESTS Continued.
#1 still being used as
standard.

HORN 50

RETRIAL -

~~100%~~ - 100%

HORN 51

RETRIAL-

90°/s

HORN #66

100⁺/r

Norm # 67

75 1/2%

Horn # 68

50%

HORN # 69

10%

HORN # 70

10%

HORN # 62

RETRIAL - First one had a
jump in the record and
you could not judge it.

105 ^{a/p}

EXP. XI.

Using an upright piano and
elevating it as described on
opposite page

Chopin Waltz by Miss Bucklander

a) Upright Piano Horn #2
Piano elevated so that center of sound-
ing board is directly opposite horn
Piano 6 ft. from horn. Cow hair
screens forming lane about
5 ft wide between horn and
piano.

Not enough swell
Plenty loud enough
for regular records
quality tango

b) Upright Piano Horn #2

Same position as last but
with face of sounding board
covered with cow-hair diaphragm
with the exception of an 8" x 24"
opening.

Glandorp Miller
Recorder

Not so loud, seems
a little better quality
but not right

tango-

Must be louder for

Reg disc -

EXP XII

Test of conditions as in XI.
for vocal work

Evening Star - Dawson

Voice Horn #2

Same as last, Singer
24" from horn Standard Miller
Recorder

Pretty good
loud enough for disc

Ditto sang 4 ft from
Edge horn

About 70% of loudness
Required for disc

EXP. XIII

RECORDER TEST, conditions
Same as in XI (f)

Chapin Wally, Miss Bucklinder

#9 Recorder

100

#50 Recorder

110% quality

about same, perhaps shade
worse -

EXP XIV

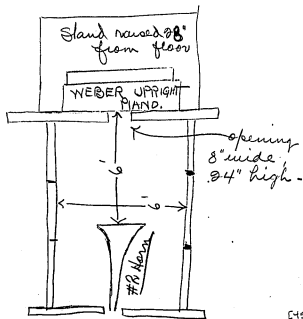
GENERAL TEST OF RECORDERS

General Test A Recorder

- 11/23/5 -

Tests of Recorders

Weber Upright Piano - on stand
28" from floor. In cow hair
booth as shown, with
opening at back 8" x 24" -



Test A-

RECORDER # 9

✓

Quality 100

Lead 100

RECORDER # 73 W

✓

Quality 105

Lead 105

Given back
to promoter
Nov 26

XXX

RECORDER # 2 W

✓

Q 85

L 90

RECORDER # X-W ✓

Q 90

L 90

✓ *Noted*

RECORDER # 53 ✓

Q 90 *read.*

Loud 115 *read.*

RECORDER # 69 ✓

Q 100

L 100

✓ *Good Sample*

RECORDER # 44 ✓

Q 95 ^{Good}
L 115

RECORDER # 67 ✓

Q 103 ^{and had spring}
L 103

RECORDER # 50 ✓

Quail 104 ^{Good quality}
L 122 ^{very Good}

RECORDER # 62 ✓✓

Serial 90

L 85 ✓

RECORDER # 58 ✓✓

Q 90

L 98 Serial

RECORDER # 51 ✓✓

Serial 110

L 115

X

RECORDER #64

✓✓

Q 90
L 90

RECORDER # 52

✓✓

Q incl 85

L incl 90

Truck too deep

RECORDER # 60

✓✓

Q incl 90
L 100

pebble
surface

RECORDER #66 x✓

Q 60
L 60

Made Over

Red surface

RECORDER #57 x✓

Q 75
L 75

RECORDER #54 x✓

Q 75
L 75

Made Over

REORDER #55

✓✓

Q 50

L 50

Mark Mark
May 1985
in

REORDER #59

✓✓

Q 60

L 60

Made Corv

REORDER #71

Q ~~9~~ 85

L 95

David
Kirkham

Shirley M.
Eisen

RECORDER #68

Q 95

L 85

✓

RECORDER #65

Q 100

L 65

✓

RECORDER #40W

Q 115

L 116

XX

Just back
to normal

603

RECORDER # 72 ✓✓

Q 90

L 100

Stamp
7/10/1944

RECORDER # 73 ✓✓

Q 80

L 95

RECORDER # 74 W ✓✓

Q 100 to 102

L 115

Stamp
7/10/1944

Record #51
Heavy playing with chords.

EXP. ~~XV~~

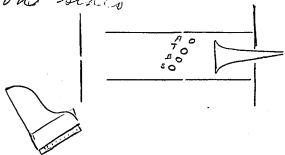
QUARTET EXPERIMENTS
(VOCAL)

Rigoletto Quartet.

Nov 21/1915

a) Quartet

Recorder #51 Horn #8
singers in position of Exp VIII
cow hair screens at back
and on sides



Cow hair mats were placed on
floor of booth and in the second
record also suspended to form
a roof to the booth.

Mr Edison thought both
records.

"Pretty Good"

b)

Quartet

#B HORN WITH FLARE ADDED
Recorder # 51, upright piano
in position of Exp XIV, Singers
in position of XV a.

EXP XVI

TEST FOR VALUE OF FLARE
ON HORNS.

Nov 26, 1915

Kathleen Macourman
at three feet

HORN #43

Small square horn on which McEwen
wanted flare put.

WITHOUT FLARE

If this is 100%

WITH FLARE

This is 250%

HORN #29
Glass Horn to which flare
has been added

WITHOUT FLARE

This is 108%

WITH FLARE

This is 208%

Exp. XVII Nov 24/15

TEST FOR VALUE OF COW
HAIR ROOF TO BOOTH

Recording outfit changed in position, horn now running lengthwise instead of crossways in room. New cow-hair screens also used, same have no wood exposed on face of screens.

Booth similar to ~~III~~ is arranged with the new screens; piano, however being 12' instead of 6' from horn.

Evening Star Dawson

Rec. #51, piano 12 ft from horn, singer 10 ft away, 6 ft wide, cow hair mats on floor only, in a and also over top in b.

a) WITHOUT ROOF

Quality 100%

Loudness 100%

WITH ROOF

Quality 120%

Loudness 80%

EXP XVIII

TEST FOR WIDTH OF BOOTH

Sugar 10 ft from floor
Booth in a room as XVII, in to only
width is changed

a) WIDTH about 6 ft

Load 100

Quality Sugar 100

b) WIDTH about 7 ft

Load 115

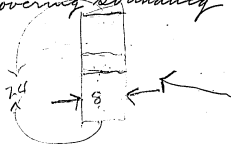
Quality Sugar 100

Quality Penns
not so good
as 6 ft

EXP XIX

PIANO TEST of
Conditions same as

XVIII, except for opening
in felt covering sounding
board.



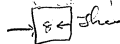
Hungarian Rhapsodie - Miss Brothman

R. #51 Piano 12 ft.
from horn, with 9'x12'
cow hair on floor and
forming roof.

Opening in front of sounding board 8"x24"

This is clearer & same loudness
as Reg. Its quad - I think
clearer - but recorder not sensitive
enough

Same as 6000 but half
Cut in 1/2 (8"x9")



Quadrately quad, but
Some weak
reactions the 8x24
& more sensitive Recorder

Golden Piano
When it could be greatly improved

EXP ~~XX~~
TEST OF RECORDERS

Wally - Miss Brackbinder

Recorder # 54
If 51 in 100% This - 25%

Recorder # 59
20%

Recorder # 66
40% Quality
very good

Recorder # 70
35% - needed too
light. Quality fair

EXP ~~XX~~ CONT
TEST OF RECORDERS

Recorder # 9

Recorder # 67

Recorder # 73

Recorder # 69

Recorder # 44

Recorder # 50

EXP XXI

TEST OF SHELLAC
USED INSTEAD OF
WAX TO HOLD TAIL
ON DIAPHRAM

Evening Star ERD
Piano and booth as in
XXI a.

Recorder # 65

Singer at 6 ft from horn

a) BEFORE 1ST CHANGE
(Tail held in place with wax)

~~So~~ Not blue as

test last night - assuming
was made it less sensitive
~~probably by construction of line~~

b) AFTER 1ST CHANGE
(Tail held in place with shellac)

No changes

EXP ~~XXI~~. CON.

TEST OF RECORDER
#65 WITH TAIL

HELD ON WITH SHEWAC

Recorder #65
After Change
SINGER AT 2 FT.

SINGER AT 10 FT.

EXP. EXT. CON.

TEST OF Recorder #65
WITH ONE COAT OF
SHELLAC ON
DIAPHRAM.

Recorder #65

After 2ND. CHANGE
(One Coat of Shellac on Diaphragm)
a) Singer at 6 ft.

No blub-

Not so sensitive as without

Extra Coat Shellac -

b) SAME AS a.
Singer at 2 ft.
no blub-

c) SAME AS a.
Singer at 10 ft.
no blub -

EXP XXII

RECORDER TEST
of # 66

Recorder # 51 (standard)
Singer at 6 ft

Recorder # 66
Singer at 6 ft

Recorder # 66
Singer at 2 ft

Recorder # 66
Singer at 10 ft

EXP XXIII

TEST OF RECORDERS

Recorder # 51 @ 2 ft

100% Low
100 Quality

Recorder # 51 @ 10 ft

~~100% Low~~
~~100 Quality~~ do

Recorder # 65 @ 2 ft

105 Low
95 Qual -

Recorder # 65 @ 10 ft

do

Recorder # 66 @ 2 ft

Lowness 80
Clean - Quality 105

Recorder # 66 @ 10 ft

do

Recorder #70 @ 2 ft
Loud 94
Quality 95

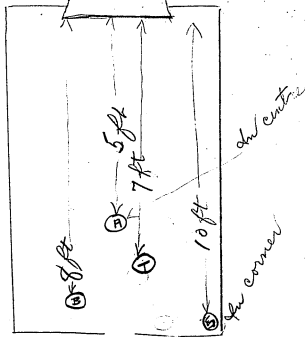
Recorder #70 @ 10 ft
do

Recorder #73 @ 2 ft
(This recorder has large cork)
Loud 95
Quality 90

Recorder #73 @ 10 ft
do

EXP ~~XXXX~~
QUARTET

Recorder 51
Position A

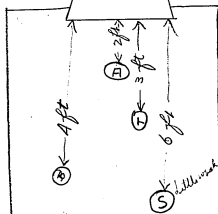


Position A

See Next Page
Edison Thought Pos B the best
Mr Poe C next and Pos A the worst.
but thought all were
"Fairly Good"

XXX Exp

Recorder 51
Position B

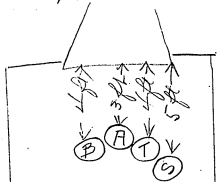


Pretty good
& nearly closed
enough - each voice
separate
no cellophane
soundings

POSITION B

See Opposite Page
and also Next Page

Recorder 51
Position C



done enough but
not so good as
XXX - previous

Position C

EXP XXV
RECORDER TEST

Recorder # 51

100 loud
100 Qual

Recorder # 57

110 loud
115 Qual

Recorder # 73

Blubs

Recorder # 70
Blubs - loud 80

Recorder # 55
Qual 75
loud 80

#54

Low 80

Quality 75

Mr Edison thinks #54 the
"best yet" and orders it to
replace #51 as standard

Exp XXVI
Recorder Test

Sang as loud as she
could head in horn
only jumped out a
little & scarcely
noticed it in
hearing but
shows in microw

Recorder # 57

54 best yet

Recorder # 54

Tracked too deep on its own and
scratches -

Recorder # 70

loud 90

Amplitude 80

Recorder # 55

loud 75

Amplitude 70

Recorder # 73

Scratches

Recorder # 66

Nearly as good as 57
but little scratching

#57

10ft. Blubs — need tighter
100% loud —

#65

90% Vol —
analog 100

#75

Blubs
90 loud —

EXP ~~XXVII~~

RECORDER TEST

Carry Me Back to Old Virginia

Dec 9/15

Booth rebuilt today, to eliminate all cracks and leaks where cone might escape from booth. Perce also placed on roof of booth, replacing mats which heretofore been stretched across top to form roof. Size of booth remains 9' x 12', and positions of piano horn etc remain the same.

#2 horn with large brass flange which has been used exclusively in all experiments since EXP ~~XXII~~ and continues to be so used.

Recorder # 57

Reg

Recorder # 76

110 loud but scratchy + ng

110 ft 110, scratchy ng
must get out scratchy tracks

Recorder # 79

90 loud

120 Scratchy no double
waves as in all others
including 51 to 57

EXP ~~XXVIII~~
RECORDER TEST

Dec 10/15

Recorder #57

100% (Low)
100 Quality

Recorder # 76
(Tightened)

Blebs at 2 ft -
105 at 10 ft head 105

Recorder # 79
(Tightened)

Low 75
Quality 75

Recorder # 74
Low 80 -
Quality 70

Exp XXIX

RECORDER TEST

Dec 11/15

Recorder #57

Recorder #74

N. G.

Recorder #76

Has squeak

Recorder #79

About equals 57

John Ott Recorder

A Little Better than 77

EXP XXX

Recorder Test

Erving Star
E.R. Dawson

Dec 14/15

1 1/2

Recorder #57

at 10 ft (pond) 100 ft



6 ft

100 ft

only 1 sample taken

Piano ok 10 ft (pond) ok in practice 7 ft or 6 ft
will get record as soon as possible 8 ft or ok

0015

Recorder # 74

(Surface)

75 ft (pond) 100 ft

0025

Recorder # 76

90 ft (pond)

Recorder # 77

95 ft (pond)

Dec 14, 1915

Recording Outfit moved from laboratory to #4 building, where booth similar to the one before used has been constructed, a little more substantially built however.

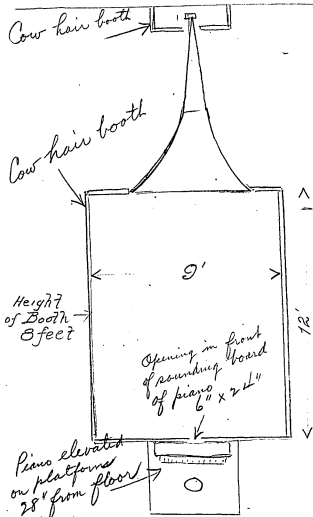
The height of the booth has been raised a foot to accommodate the new horn which is larger than the last one but of like shape and material.

Booth of padded screens is now built around the recording machine $3' \times 7'$. A screen also laid across the top forming padded roof.

Cow hair matting is laid on floor as before.

Horn is suspended from a timber frame by a rod on ball bearings.

Exp ~~XXX~~ was made under these conditions.



EXP XXXI
RECORDER TEST

Dec 15/15

Last Race of Summer
Miss Ayers

Wednesday
65 new standard -

Recorder # 57
 $\frac{1}{16}$ / 1000 - Standard -
Low 100 quality 100

Recorder # 65
Diaphragm $\frac{1}{16}$ " x .0015"
Aluminum Disc
Dia 120
110
Quality at 2 ft. much better than 57

Recorder # 75
Diaphragm $\frac{1}{16}$ " x .0015"
Aluminum Disc
Dia 110
105

Recorder # 77
Diaphragm $\frac{1}{16}$ " x .0015"
Al disc
Dia 95
95 Standard

Recorder # 78
Diaphragm $\frac{1}{16}$ " x .0015"
Al disc
Dia 75
100 -

15 is considerable more than
admitted than 5% but
on calls at 5% ^{the amount}
Plotted twice ^{on plot in}
from 1970

EXP. ~~XXXII~~

TEST OF SILK CURTAIN
OVER FRONT OF HORN

Dec 14/15

Curtain of Silk stretched
across booth in front of
horn

WITHOUT SILK

At 2 feet
At 10 feet
Piano

WITH SILK

At 2 feet
At 10 feet
Piano

Silk did not
make any difference

EXP ~~XXXIII~~

RECORDER TEST

Dec 16/15

Recorder # 65

Dia. $\frac{15}{16}$ " X .001" Recorder # 77 65 B $\frac{1}{1000}$

Too thin dia
not clear -

Dia. $\frac{15}{16}$ " X .001" Recorder # 78 65 B Deep
 $\frac{1}{2}$ load of 77 -
seriously tracking

Dia $\frac{15}{16}$ X .001 Mica Recorder # 79
Load 80
Amately poor

EXP ~~XXXIX~~

TEST OF CHIMES

Dec 16/15

CHIMES #65
AT 2 FEET

Swell is continuous + cant read

No blue

OK

CHIMES
AT 8 FEET #64

No blue or

swell is very much less +
cant catch much
should be 10 ft or more

EXP. XXXY

Test of 65 Model Recorders

Dec 17/15

#65

100 (loud)

Quality 90

#65A (54)

90 (loud)

100 quality

#65B (74)

Loud 40

These recorders were
all about 6 ft. away
at a distance within 2 ft.

EXP ~~XXXVI~~

Quartet Dec 17/15

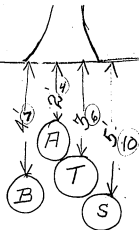
Pos A Recorder #57

Too close to
storm

Pos A Recorder #45

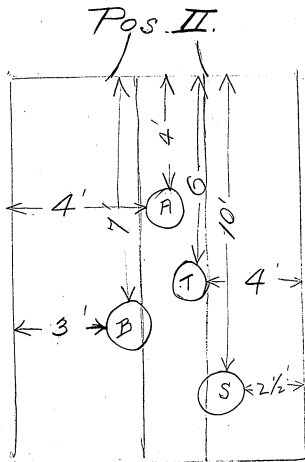
More sensitive
than 57 but
The Edison says
use 57 today

Pos I



Very Much Better.
 Pretty good in fact

Record for Blue Amberol
 made in this position.

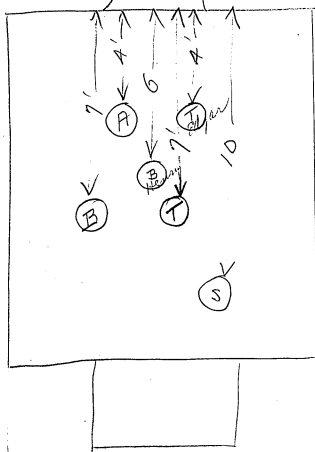


EXP XXXVII

SEXTET

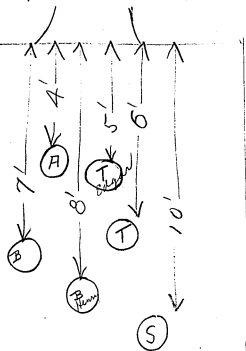
Out of Balance
Henry too loud

Pos I



Balance Better
but not right yet

Pos II.



EXP. ~~XXXVIII~~

RECORDER TEST

Dec 15/15

Evening Star
Dawson

RECORDER 57

100 L
100 dual

Recorder A 65

100 Load
100 dual - Semich

Bud-

Recorder A 66

80 Load 2 ft
at 10 ft 100 Load

Recorder B 69

100 hand at 10 ft
90 at 2 ft.

Recorder # B 73

Scratches too
much

Recorder # B 77

at 2 ft 110

at 10 ft 75

No scratch -

Recorder #57

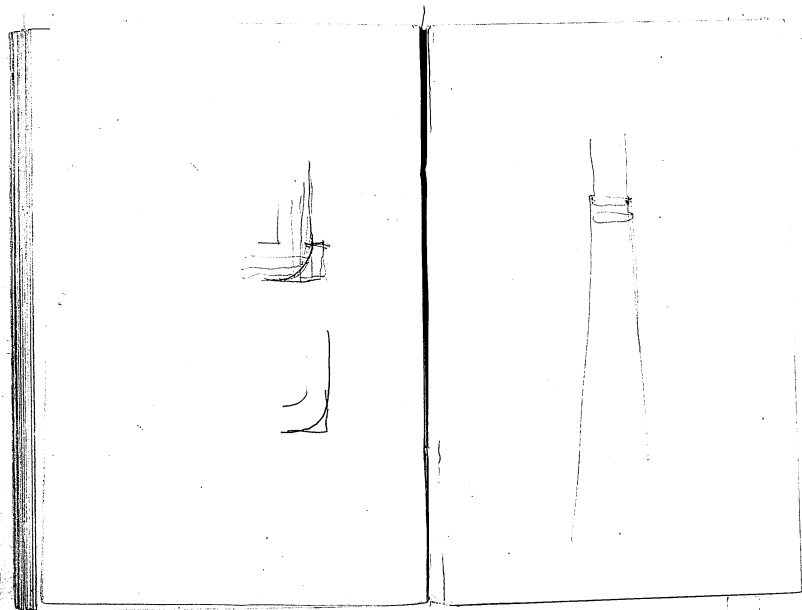
Standard

Recorder #78
Celluloid Diaphragm

Recorder #73
Fish Bladder Diaphragm

EXP XXXIX

JOHN OTT Recorder



**Notebook Series -- Notebooks by Edison and Other Experimenters
Recorder and Recording Experiments -- Miscellaneous Books
Notebook, N-16-07-03.2**

This notebook was used during July -October 1916 and January-May 1921 by Edison, Absalom M. Kennedy, George J. Werner, and possibly other experimenters for notes on experimental recordings. In the first part of the book, details of recording sessions from 1916 are provided by Kennedy and Werner. Some of these entries contain comments by Edison, while others mention Edison's verbal remarks or instructions. This section ends with an undated note from Edison to Walter H. Miller, head of the Recording Division. The second part of the book, containing entries by Werner from 1921, begins with the title page: "Record of Recorders for Columbia St. Studio." Included are detailed drawings of numbered recorders, along with notes indicating verbal comments by Edison. Inserted into the book are notes from 1914-1916, some by employee F. C. Burt, which were apparently removed from one or several notebooks, along with additional items from 1921. The front cover is labeled "Record of Recorders For Columbia St. Studio. G.J. Werner." The book contains approximately 50 unnumbered pages followed by 60 numbered pages. At least one page was removed from the book before the pages were numbered.

Victoria Tests

87150
Home Co.,
MFG. STATIONERS,
36 JOHN ST.
AND
19 PLATT ST.
NEW YORK.

7/3/16

- C1- Large sheet horn compared
with cast horn.
Records 109 & 121.
Violin solo
Distance 12" in each case.
- C2- Large sheet compared with cast
horn.
Rec. 132 & 122.
Violin solo.
- C3- Large compared with cast.
Rec. 130 & 108
Violin solo.
- C4- Comparing back & front of
violin towards cast horn.
(1) at 18"
(2) " 36"
Rec. 109
- C5- (1) Comparison of front & back
of violin at 5 ft. from cast horn.
Rec. 109.
(2) Comp. of violin at 6 ft. from cast
horn & at 1 ft. from large horn.
Rec. 109

7/7/16.

C6 - Recorders 130-100-118.

Test of Piano & Violin solos
Large Horn

C7 - Recorders 108-132-129-
103.

Test - Piano & Violin solos.
Large horn

C8 - Recorder 123

Test - Piano & Violin solos
Large Horn.

C9 - Recorder Test — 7/12/16.

132-100-129-103
Large Horn

~~CT0~~ Recorder Tests — 7/12/16.

108-130-127-123-104-118.
Large Horn.

~~CH~~ Recorder tests. 7/12/16

117-115-107
Large Horn.

~~CT2~~ Recorder tests 7/14/16
132-134-120-107-
Large Horn

~~CT5~~ Recorder tests 7/18/16

132-131-102-134-109-121
Large horn.

~~CT7~~ Recorder tests 7/18/16

113

Large horn

~~C15~~ Recorder tests 7/20/16
132
126-128-106
Large horn.

~~C16~~ Recorder tests - piano 7/22/16
Std. 63 - 1.7, 1.8, 1.9.

~~C17~~ R. tests - piano
R. 132-128-126

~~C18~~ R. tests - piano
R. 113-121-106

~~C19~~ R. tests - piano
R. 105-130-129

✓(C20)

Recorder without test disc
7/28/16
Sister

R. 132-122-114-110

✓C24- Recorder with test disc
mother

C22 Recorder tests - piano

R. 132-131-127-103-107-127

7/28/16

C23 - Recorder tests - piano

R-130-102-117-120-118-134

7/28/16.

~~Cat~~ Recorder tests - piano

R. 113-107-128-105-105-126
7/28/10

~~Cat~~ Recorder tests - piano

R. 130-129-109-103-121-115
7/28/10

~~Cat~~ Recorder tests - piano

R. 110-122-114
7/28/10

~~Cat~~ Rec. tests - player, piano

132-120-118-105-100-123

~~Cat~~ Rec. tests - player piano

132-102-103-127-131-104-107

~~Cat~~ Rec. tests - player piano

132-106-122-110-125

~~30~~ Rec. tests - *player piano*

132-129-130-117-115

~~31~~ Rec. tests - *player*

132-113-126-122-103-109

~~32~~ Harm. tests - *with & without reflector*

Rec. 113

~~33~~ Test with & without reflectors.

Violin at 10°.

~~34~~ Recorder tests - *piano*

100-102-103-104-105-106

~~35~~ Recorder tests - *piano*

128-129-130-131-132-50

~~36~~ Recorder tests - *piano*

107-108-109-110-113-114-115

57. Recorder tests - piano

117-118-120-121-122-125-127

58. Recorder tests - violin

123-124-125-126-127-128-129-130-131-132-133-134-135-136-137-138

59. Recorder tests - violin

120-121-122-123-124-125-126-127-128-129

60. Recorder tests - violin

134-135-136-137-138-139

61. Recorder tests - violin

140-141-142-143-144-145-146-147-148

62. Recorder tests - small horn - violin

Sept. 22/16

43. Piano with Player attachment
To determine opening of
piano.

12' distant opening: 1 panel wide

① - 1' wide

② - 3" "

③ - 5" "

④ - 7" "

⑤ - 9" "

⑥ - 11" "

⑦ - 13" "

⑧ - 15" "

⑨ - 17" "

⑩ - 21" "

⑪ - 25" "

⑫ - 29" "

⑬ - 33" "

⑭ - 41" "

12' Distant opening 3 panels wide

① - 1" - wide

② - 3" "

③ - 5" "

④ - 7" "

⑤ - 11" "

⑥ - 15" "

⑦ - 19" "

⑧ - 23" "

⑨ - 30" "

⑩ - 40" "

(47) - Piano 6' distant, opening 1 panel

- ① - 1"
- ② - 3"
- ③ - 5"
- ④ - 7"
- ⑤ - 9"
- ⑥ - 11"
- ⑦ - 13"
- ⑧ - 15"
- ⑨ - 17"
- ⑩ - 19"
- ⑪ - 21"
- ⑫ - 23"
- ⑬ - 25"
- ⑭ - 27"
- ⑮ - 29"
- ⑯ - 31"
- ⑰ - 33"
- ⑱ - 35"
- ⑲ - 37"
- ⑳ - 39"
- ㉑ - 41"
- ㉒ - 43"
- ㉓ - 45"

6' distant, 3 panels opening

- ① - 1"
- ② - 2"
- ③ - 3"
- ④ - 4"
- ⑤ - 5"
- ⑥ - 6"
- ⑦ - 7"
- ⑧ - 8"
- ⑨ - 9"
- ⑩ - 10"
- ⑪ - 11"
- ⑫ - 12"
- ⑬ - 13"
- ⑭ - 14"
- ⑮ - 15"
- ⑯ - 16"
- ⑰ - 17"
- ⑱ - 18"
- ⑲ - 19"
- ⑳ - 20"
- ㉑ - 21"
- ㉒ - 22"
- ㉓ - 23"
- ㉔ - 24"
- ㉕ - 25"
- ㉖ - 26"
- ㉗ - 27"
- ㉘ - 28"
- ㉙ - 29"
- ㉚ - 30"
- ㉛ - 31"
- ㉜ - 32"
- ㉝ - 33"
- ㉞ - 34"
- ㉟ - 35"
- ㊱ - 36"
- ㊲ - 37"
- ㊳ - 38"
- ㊴ - 39"
- ㊵ - 40"
- ㊶ - 41"
- ㊷ - 42"
- ㊸ - 43"
- ㊹ - 44"
- ㊺ - 45"

(48) - Experiment with $\frac{1}{4}$ " recorders
 ① - Rec. 1 } Cheyer Piano
 ② - " 0 } at 12'-7"
 1 panel opening.

(49) - Experiment with $\frac{1}{4}$ " recorder
 1 panel wide
 30" opening at 6'

(47) - Exper. with $\frac{1}{4}$ " recorder
 1 panel wide, 7" high
 recorder 0

(47) - Rec. 2
 Piano. Large horn. Large trumpet.
 Viola " " " "
 Piano. Large " Small "
 Violin. " " " "

H-1 Hawaiian Gutter Duet.

Ellen March

Cynthia Kincaid and Robert Maialeale

R-126-10/20/16.

Hawaiian Gutter - 5 ft. from 1st horn (1-3)

With harmonium retractor
over head.

Gutter

10 ft. from horn (7-8)

Time: O.K.

(verbally min. 5)

A-2 - Mauna Kea
 Baritone Solo by Mr. Kinsaku
 Accompanied by Ford Hawaiian Quartette
 R 128 - 10-30-16

1st Bass & Hawaiian Steel Guitar - off from horn	①
Baritone & Guitar	6" " " ⑤
Mr. Bass & Ukulele	9" " " ②
Tenor & Guitar	5" " " ④

OK 749

X-3 - Tami-Tami.
R 130 - 10/20/16.

1st Bass & Hawk, St. Antan	- 3 ft from horn	①
Baritone & Antan	- 6" " "	②
1st Bass & Eupalele	- 9" " "	③
Tenor & Antan	- 5" " "	④

N-4 On the Beach at Mai-ki-ki
R130 - 10/20/16.

Mr. Bass & Steel Guitar.	off from horn	(1-2)
Guitar & Soloist	4" " "	(2)
Guitar & Tenor	10" " "	(7)
Ukulele & Bass	10" " "	(8)

No - Rag American
type not wanted
want soft slow
Hawaiian plaintive
Music —



H-5 Pukohana Naty.
Instrumental

R126- 10/2#116.

Steel Guitar 7ft from horn with speaker ①

1 Guitar 8'

(5-2)

2 " 8'

(6-1)

Amakale 10'

(8)

OK -

Naty Base & high
Base is strong and
high weak just as
all music should
be & just opposite
in our second

H-6 The Rosary
Hawaiian ~~the~~ Under Seal
By Robert M. M. M.
R/26 - 10/20/16

NO

2ft from horn #2

H-7 ~~Shed~~ Plantation

R. 130

ms Bars - Steel Guitar - 2'	①
1st Bass - Ukulele - 3' from horn	②
7' " "	③
Tenor Guitar 7' " "	④-⑥
Baritone - Guitar 7' " "	②-⑤

Solo Position
Quartette Position

no

H-8

- C & P.

No

Steel Gunter -	3'	(1-2)
Gunter & Peritone	7'	(5)
Gunter & Pomeroy	10'	(7)
Eupelake & Bass	14'	(26)

H-9

Kaena

tenor too strong

Tune ok -

R/30 - 10/21/16

Full Tutar 3'

Tutar & block 6'

(15)

(6)

H-10^a

ala. Ha. Qe

good -

ensemble too strong

Ala. Ha. Qe

Rich Harmonium

This is much better
than the first principally
because positions of
rings better

Steel Guitars & M. Bass 2 ft ①

Extrale 15' ②

2 guitars 10' at ③ & ④ - Harmonium 10' at ⑤

H-11

Ka-Masli

NO-but might be
got OK

Bartone at considerable
too low.

H-12

Ka-Masli

R130 - 10/23/16

Still Quintan & Bass 3'-
Quintan & Tenn 6'-
Quintan & Cantone 10'-
Empalme & Bass 10'-

③
⑥
⑦
⑧

No

H-13-1

Kuw - Ipo (my sweetheart)

R130- 10/22/16.

Soloist & Guitar	7'	5
Mt. Bass & Steel Guitar	3'	3
Tenor & Guitar	6'	6
Bass & Ukulele	10'	8

fair -

N-13-1

F

Kuw - Spo (My Sweetheart)

R/30 - 10/23/16.

Soloist Guitar 10'
Steel Guitar & Bass 3'
Tenor & Guitar - 6'
Euphonium & Bass - 10'

⑦
③
⑥
⑧

N-14.-1

Kilima Mochy - Instrumental

R126 -

10/23/16.

Steel Guitar 3'

Guitar #1 10'

Guitar #2 10'

Eukalele 20'

(9)

(8)

(7)

(22)

OK

H-14-2

Rilima Maltz

R126 -

10/23/6

Steel Guitar 3'

Guitar #1 10'

" #2 10'

Euphone 15'

③

②

⑦

26-28

H-15-1-

Kahokuwale Song

^{Arranged 7-6}
R130 -

10/23/6.

Tenor & Guitar	7'	⑥
Baritone & Guitar	10'	⑦
Mr. Bess & S. Guitar	3'	③
Bass & Ukulele	10'	②④

H-15-2

Kahokuhele

St. Kuitau & Mo Bass	3'	③
Kuitau & Tenor	7'	④
Beritone & Kuitau	9'	⑦
Eukalele & Bass	9'	②①

No

H-16-1 You-look-beautiful

Nehi-Nehi-Oe

R-130 - 10/22/16.

Steel Guitar, one Bass

3'

③

Guitar & Tenor (Solent)

8'

⑥

Guitar & Banjo

10'

⑦

Eukalele & Bass

9'

⑧

H-16-2

Neki-Neki-Oe

R/20 - 10/23/16.

Steel Guitar w/mt Bass 3' - ③
Guitar Tenor Banjo (Steps forward on solo) 9' ⑥
Guitar & Banjo (Steps forward on low notes) 9' ⑤
Euphonio & Bass 9' ②②

H-16-3

Mehi-Mehi - Oe
R130 - 10/23/16.

Steel Guitar & snr Bass	3	5
Guitar Tenor	8	6
Baritone Guitar	10	7
Bass Ukulele	10	8

Of 2 I think but all
blubbered up in
Chorus

Chorus rather all
out of time & out of
time with their own
melodies = If Tenor
along song without chorus
it will be OK

A-17-1

R130 - Onana
10/23/16.

Steel Guitar and Bass	3'	③
Acobalele and Bass	10'	⑧
Guitar and Baritone (Solo)	10'	⑦
Guitar and Tenor	7'	⑥

H-17-2

Anaona

R 120 - 10/28/6.

Steel Guitar & Bass	3'	③
Baritone & Guitar (Solo)	10'	⑦
Tenor & Guitar	7'	⑥
Bass & Euphonium	15'	⑩

OK.

A-18-1

Ahahi - Hoi, Dlouhbut (Hec)

R 130 - 10/23/16

Tenor & Guitar (Solo)

8'

⑥

Baritone & Guitar

15'

⑦

Bass & Ukulele

15'

⑩

1st Bass & S. Guitar

3'

③

OK —

N-19-1

Kaala

R130 - 10/23/6.

Baritone & Guitars (Solo)
Tenor & Guitars
2 Bass & Steel Guitars
Bass & Ukulele

12' ⑦
8' ⑥
5' ③
15' ⑩

OK -

N-20-1

Kahinano
R130 - 10/23/06.

Tenore & Guita (Solo)
Baritone & Guita
Bass & Ukulele
" " & S. Guita

8'

(6)

15'

(9)

15'

(10)

3'

(3)

OK

H-21-1

Mili-Mili-Mai
R/30

Bass & Guitar (Solo)	7'
Tenor (Saxophone) & Guitar	9'
Tenor & Euphonium	15'
Bass & St. Guitar	3

5
6-8
12
3

NO

A-22-1

Makahana

R130 - 10/23/10

Tenor Solo Guitar 7'
Baritone Guitar 15'
Bass Ukulele 15'
Bass + Steel Guitar 3'

⑥
⑨
⑩
③

OK -

H-23-1

Kohala Marsh -
R126 - 10/23/16

Steel Guitar
Guitar

3'
10'

③
⑥

OK

H-24-1

Maid of Hanolulu

R-130 - 10/23/16

Steel Hunter Tower	3'	(3)
Berstone Hunter (Solo)	14'	(9)
Ross & Eukalele	15'	(10)
Tower (Palotto) Hunter	18'	(27)

No -

Walter Miller -

Look out for the Baritone
he is extremely too loud
& the tenor is weak. →

We placed him 15 ft away
& the tenor 3 ft & yet
Baritone is too loud
tell him to sing $\frac{1}{2}$ volume

They interfere badly in
Chorus & the Chorus is
apt to be too loud
take Chorus weaker

Σ

RECORD OF
RECORDERS
for
COLUMBIA ST. STUDIO.

$1\frac{5}{8}$ " DIAPHRAGMS.

$\frac{3}{4}$ " OPENINGS.

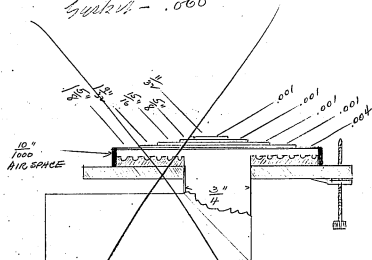
DIAPHRAGM NO. 1.
RECORDER

June 21, 1943 # 43

2 1/2 4 7/8 11

1 1/8 1 3/8 1 1/4 2 1/8

Gasket - .060

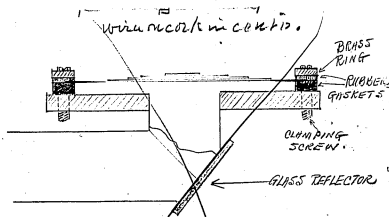


THIS IS INSERTED IN
AIR SPACE WITH GASKET ON EDGE.

3/4 OPENING - 1/8" DIAPHRAGM.

GASKET ON END - .075

DIAPHRAGM NO. 2
RECORDER



DIAPHRAGM = 5-5-13 $\frac{1}{2}$ -16-18^{#2} THICKNESS
1000

DIAMETERS OF LAYERS = $\frac{1}{8}$ " $\frac{1}{32}$ " $\frac{15}{32}$ " $\frac{5}{8}$ " $\frac{11}{32}$ "

RUBBER GASKETS = LOWER $\frac{51}{1000}$ " THICK, UPPER $\frac{38}{1000}$ " THICK
 $\frac{1}{2}$ " INSIDE, $\frac{1}{2}$ " OUTSIDE, $\frac{3}{16}$ " WIDE

BRASS RING FOR CLAMPING = 9 SCREW HOLES.
 $\frac{1}{8}$ " INSIDE, $\frac{1}{8}$ " OUTSIDE, $\frac{1}{32}$ " THICK -

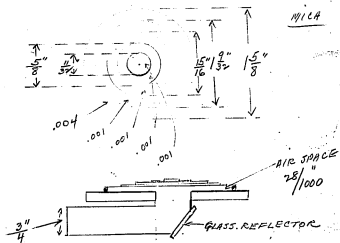
Recorder #2.

MAY 5 1921

1. Paper film. same as page 3
Broken screw as before #3
Spring same as #7.

5

DIAPHRAGM NO. 3.
RECORDER



6

7.

DIAPHRAGM NO. 4.
REORDER

8

DIAPHRAGM NO. 5.
RECORDED

11

DIAPHRAGM NO. 6,
RECORDER

7/21

NICK DIA = 4 - 1 - 1 - 1 THOUSANDTHS.
GASKET = $\frac{.88}{1000}$ " THICK $\frac{3}{32}$ " WIDE

WITH WIRE CONTROL -

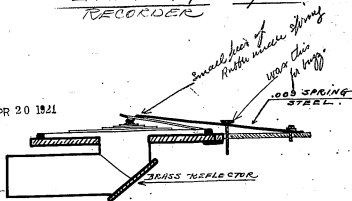
12

25
1000
1000

13

DIAPHRAGM NO. 7. RECORDER

APR 20 1921

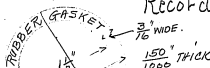


DIAPHRAGM IN ABOVE RECORDER IS PAPER
 DIAMETERS OF LAMINATIONS = $1\frac{1}{8}$ " $1\frac{3}{8}$ " $1\frac{1}{2}$ " $\frac{5}{8}$ " $\frac{1}{2}$ "
 THICKNESS OF " = .006". .007". .008". .009". .010".
 " " Gasket - $5\frac{1}{16}$ " - Width $3\frac{1}{8}$ "

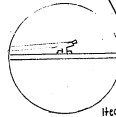
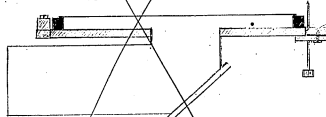
Makes a loud free tone record and holds
 very good M.E. says shows good variations on
 base. will try same thing with Mica Die. to see
 if it is quicker. M.E. says Monica.

2/2 14

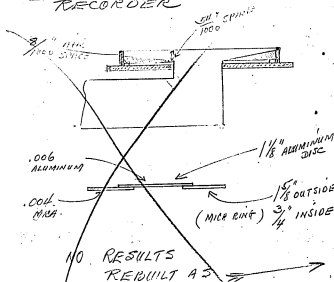
Recorder #7.



DIAPHRAGM = PAPER

6-8-14-16-19-"
1000WITH WIRE CONTROLL IN Center only -
REGULAR ARM $3\frac{1}{8}$ " D.F.H.MATCH Spring
3/32" Wide .004 Thick.Heated and layed on Dia.
under mouth in line with
head of Arm.

DIAPHRAGM NO. 8. RECORDER



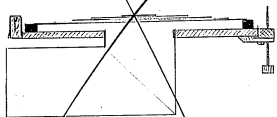
See page 16

1/4" RECORDER #8

PRESSED PAPER DIA. #5

DIAMETERS: 1 5/8", 1 3/8", 1 5/8", 1 5/8", 1 5/8", 1 5/8"
THICKNESS: 3/4", 8", 14", 16", 17", 1000

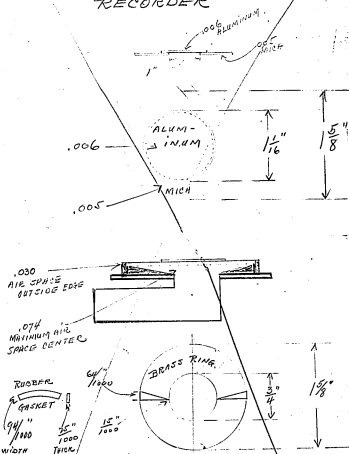
RUBBER GASKET 1 3/8" WIDE
1 1/2" → 1 7/8" → 45" 1000 THICK



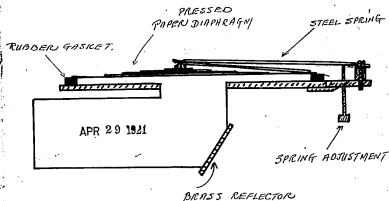
Cork in Centre on foot.

See Page 18

DIAPHRAGM NO. 10. RECORDER



RECORDING DIAPHRAGM NO. 10.



PAPER DIAPHRAGM.

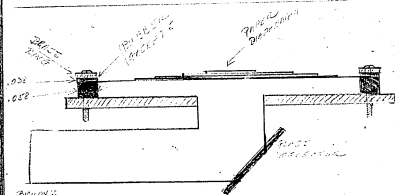
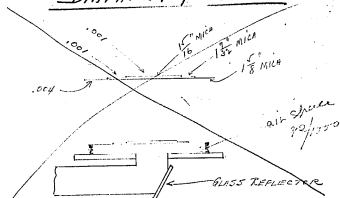
DIAMETERS OF LAMINATIONS $1\frac{9}{32}$ " $1\frac{15}{32}$ " $1\frac{5}{8}$ " $1\frac{11}{16}$ "

THICKNESS " .0075 ALUM. .012 .014 .018 "

RUBBER GASKET = .058" THICK $\frac{2}{16}$ " WIDE.

AIR SPACE = .058"

DIAPHRAGM NO. 11.



DIMENSIONS

PAPER DIA = .005 - .0075 - .014 - .016 - .0175

GLASS RING = 1.0" x .032 x 3/16" UPPER .032 x 3/16"

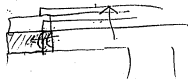
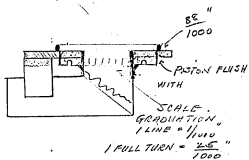
BRASS RING = 1 1/2" INSIDE 1 3/4" OUTSIDE 3/16" WIDE 1/2" THK.

9 SCREWS FOR CLAMPING

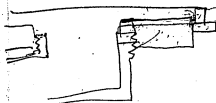
One Central Touching corn in center point,

23

PISTON DIAPHRAGM NO. 12, RECORDER



24





$\frac{3}{16}$ " WIDE
 $\frac{.85}{1000}$ " THICK OR HIGH.

DIA. SPACES 15
 ON PAGE 25, + 26

Made 5 trials with this gasket Trials #3
 $64/100 - 63/100 - 58/100 - 49/100 - 18/100$
 Best

Mr Edison comp. use this Gasket $\frac{3}{16}$ "

Tryd same as above only $\frac{1}{2}$ hole in plate
 instead of $\frac{3}{4}$

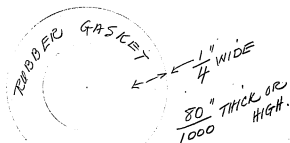
Inclusion Seal N 6.

air space

$63/100$ $63/100$ $58/100$ $28/100$ $18/100$



Trials #5.



DIA. SAME AS USED
ON PAGE 25-26-28

Made 5 trials with this gasket

$\frac{80}{1000}$	$\frac{63}{1000}$	$\frac{35}{1000}$	$\frac{28}{1000}$	$\frac{18}{1000}$	Trials #4.
-------------------	-------------------	-------------------	-------------------	-------------------	------------

best

RECORDED 13 32

2" DIA. = 1 1/8"

1 1/2" WIDE

1 1/2" DIA. = 1 1/8" DIA.

3/8" THICK

TO OVER HANG IN CENTER.

1 1/8"

Dia 4-1-1-1-Mica

BRASS RING

5 Trials Air Space...

69/1000 59/1000 49/1000 39/1000



RECORDER #12 PRESSED PAPER
DIAPHRAGM.

1000 lbs. thrust → 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80 82 84 86 88 90 92 94 96 98 100
← diameter in inches

Trials #7

25/100 63/100 38/100 25/100 18/1000
AIR SPACE → back →

RUBBER GASKET → 3" WIDE
1 1/2" → 85" THICK
1000

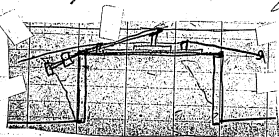
Record #13 built same as on Page 32

Made trials with and without wire control.

Trials #8
Trials W/1-2- $59/1000$ $49/1000$ without wire

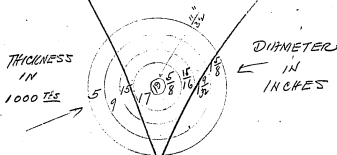
Trials #9
" " 3-4- $59/1000$ $49/1000$ with wire

Wire control much better than without
in bluffs. Mr. Edegar agrees on this
but wants further on side of blade and
tired to get same results.



36 37

RECORDER #12
PAPER DIAPHRAGM.



Tricks #10

181	Air Space	78/1000
2	"	" 763/1000
3	"	" 736/1000
4	"	" 28/1000
5	"	" 16/1000

All very good Mr. E. says.

38

38 39

RECORDER #13-

40

BUILT SAME AS OVERHAUL ON PAGE 32.

WITH NEEDLE ARM LOWERED TO $\frac{3}{32}$ " INSTEAD
OF $\frac{3}{16}$ " AS SHOWN.

TRIALS #11

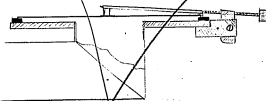
1 st	1 st Trial	Pin Place	59/1000
"	"	"	49/1000

Holds better than high arm.
W.

35-41

42

RECORDER NO. 1.

ADJUSTABLE STAY AT NEEDLE
ARM END.GASKET $\frac{3}{16}$ " WIDE, $\frac{38}{1000}$ " THICK.

DIAPHRAGM	.004-.001-.001-.001-.001, MICA	LAYERS
DIAMETERS	$1\frac{1}{8}$ " $1\frac{3}{32}$ " $\frac{15}{16}$ " $\frac{5}{8}$ " $\frac{11}{32}$ "	

TRIALS #12

Used Trials #13 instead paper dia.

W.G.

RECORDER NO. 1.

Some as on page 42

GASLET - $\frac{1}{4}$ " WIDE $\frac{50}{1000}$ " THICK

DIMENSIONS - PREVIOUS PAGE

DIAMETERS - $1\frac{1}{8}$ " - $1\frac{1}{2}$ " - $1\frac{1}{2}$ " - $\frac{5}{8}$ " - $\frac{1}{2}$ "

THICKNESSES - .008" - .011" - .012" - .014" - .015"

OTHER KNIFE SHARP AS ON PAGE 42.

TRAIL = $\frac{1}{13}$. Jan 21/211st Trial

Thia, 1/14

2nd " 58% under and with wire
M. Edison says3rd " Weak & thin with stay at end of
M. Edison arm.4th " 1/3. " " " 1/3 between
mouth.

45

REORDER #13

PRESSED PAPER DIA.

8-10-14-16- - THIN AND THIN

REG ARM = $\frac{3}{10}$ "

RUBBER GUNNET OVER HANG CAME 3V

Trials #14

1st Trial - Air Space 68/100

2 " " " 59/100

Weak,

REORDER #7

SEE PAGE 13 -

47

Trials #15.

Recorder #1.

1st Trial Rec #1 On Spoke 30/1000

" " " " "

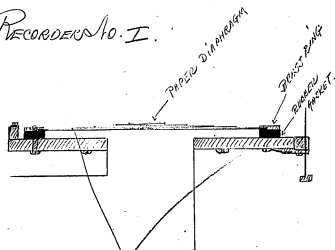
3 " Recorder #12

4 " " #7

Trials #16.

No 1-Recorder adjusted Louder. # Trial

RECORDER NO. I.



$$\text{RIMMER HASSET} = \frac{98}{1000} \text{ THICK } \frac{3}{16} \text{ WIDE.}$$

$$\text{PAPER DIA} = \frac{7-8-9-11-13}{1000} \text{ THICK.}$$

$$\text{BRASS RING} = 1\frac{1}{8} \text{ INSIDE } 1\frac{3}{8} \text{ OUTSIDE } \frac{3}{16} \text{ WIDE.}$$

$$\frac{45}{1000} \text{ THICK } 4 \text{ SCREW HOLES FOR CLAMPING.}$$

Found this to thin no overtones
See next page.

48

Recorder #1.

Rebuilt with Air Space $58/1000$


Paper dia - 3-7-10-16-16.-

 $38/1000$ Rubber gasket over dia.Clamped with brass ring sec. 48 

Dia. loose between gaskets
 to section could not control it even
 with press 11 ft. away.

50

Recorder #13 Trial #77

Overhanging Gasket.
 Built same as on page 32only change in Dia. 

Using mica for first layer then paper

4-8-11-13-15. with 1000 control.1st Trial Air Space $49/1000$

2nd " " " " Less Tension

3 " " " " " "

Mr Edison says very good.

Don change the Recorder

51

Feb 7/21

Recorder #1. Trials #18
see page 49.With Kia fastened with rubber. Cassette
and wire control in center.
Clamped with Ring 4-5 screws.1st Trial Air Space 58/1000

2 " " " " " Distention

3 " " " " " "

(Mr Ed. Says good keep this Recorder.)

Paper Rec. 5-7-10-15-16.

52

Trials #19

Recorder #6. Page 11-

1st Trial Air Space 58/1000

2 " " " " " Distention

All Very Good.

58

#11

Trials #20

Sec. 1 PAGE 121 Air Space 53/1000

1st Trial

Rec. # 11

2 "

" # 11

3 "

Rec. # 1.

4 "

" # 1.

all Good.

Fig. 5-7/2 100/100 100

Gasket 55/100 1/16 100/100

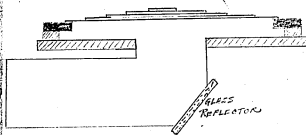
9. 100/100 Ring - Same as type 48.

7/15/20

7/15/20 OVERHANGING GASKET.

58

REORDER NO. 2.

BRASS RING SUPPLY = $5 - 8 - 13\frac{1}{2} - 16 - 18$ "BRASS RING = $\frac{55}{1000}$ THICK $1\frac{1}{16}$ " INSIDE 2" OUTSIDETURNER GASKET = $\frac{75}{1000}$ THICK $1\frac{1}{2}$ " INSIDE 2" OUTSIDEOVERHANG = $\frac{3}{32}$ "

H. G. W.

55

Feb. 16/4

Recorder #8. See page 16.

Trial #1 - Air Space 48/1000

" #2. " "

Trial #21.

56

Recorder's #1-#11-#2

all clamped with Ring.

1st Trial & Rec. #2 - Page 4

2 " " #11 - Page 21

3 " " #1. Page 51

Trial #22.

57

Feb. 23

Recorded 2. Lanthus Pinnis 7 fl.

~~7 fl.~~ open

Lerpuge 3.

Trials 23.

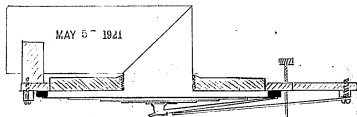
Road or 7 fl.

58

59

Recorder #12

ADJUSTABLE AIR SPACE.


 $\frac{1}{8}$ $\frac{1}{6}$ $\frac{3}{8}$ $\frac{1}{2}$

5 8 10 11

Paper No. 18 / Hayes & Sons Gaskets

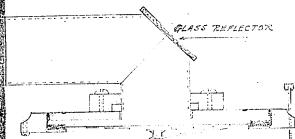
Wash Spring same as #17.

May 6th 21.

60

RECORDER NO. 15.

CLAMPED ARRANGEMENT.



DIAMETERS $\frac{1}{8}$ $\frac{1}{6}$ $\frac{3}{8}$ $\frac{1}{2}$ 15 17 10 9 6 PUNCHES IN 12" DIA.
PAPER DIMENSIONS

RUBBER GASKET

LAYER 31" APART 55"

1810

1820

[ITEM(S) FOUND IN BOOK]

Recorders for Weak Voices

30
024th Use when not to be Amplified

2 - Low & full

9 - Low. as #2 - but thinner tone.

July 1/14.

Test of Recorders at 18 feet -

2 low tone

Dia. # 50 - Loud at 30 ft high in 1st slot
6
" 2 Wind on low fuller tone.
" 40 " " " 50 # 50 fuller tone
" 8
" 11
" 10
" 30
" 7

all others weaker.

[ITEM(S) FOUND IN BOOK]

(163)

July 27, 1900

Reed in water. 52 ft. Sugar

20 - Wood - small ^{one made}

50 - Thin skin 4'

40 - Fine and fresh in time

30 - Thin skin 30 ft. of skin
with a thickness of 10 ft.

30 Made water thin to hold well

[ITEM(S) FOUND IN BOOK]

12/17/5 to

Records

J. C. Rust.

[ITEM(S) FOUND IN BOOK]

Dec. 17-1955

Stretched Records.

73 } make up same as
77 } #65 -
69 } Stock #007, paper
Shelton #001
15 x .0015 aluminum center.
16

Delivered Dec. 18 - P.M. by Mr. Manning
Entry fair.

73 not returned for identification.

77 } returned for identification
76 } (see next page for test)
69 }

[ITEM(S) FOUND IN BOOK]

Dec. 76/15-

Stretched Remian.

#77 Japanese paper -.002
coated with shellac, then thin varnish,
center aluminum 3/16 dia x .006
needle arms same size.

76. Same as 77.

~~not thick~~
~~summit is available~~

Stretched 7/20/15-

69. same as 77.

Stretched 7/20/15. Very fine quality,
but not loud enough for
S.A.G. (surface not bad).

Rebuilt

[ITEM(S) FOUND IN BOOK]

Dec 22, 1915

*105 Old Style heel
Built all way.
~~1~~ .001 inch wash 1 gasket
.001 x 5/16 aluminum center.

Tested 50% Water than - N. &.

Dec. 23, 1915

*69 (Rebuilt)

[ITEM(S) FOUND IN BOOK]

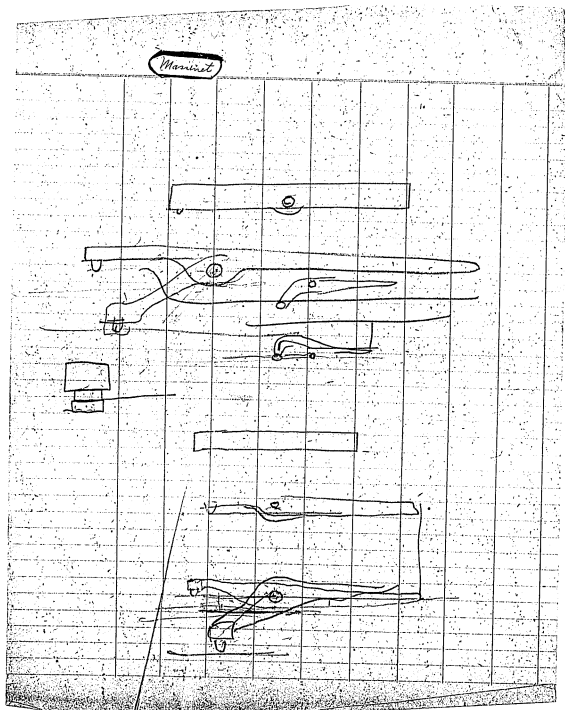
H. Lauter Feb. 23/21

Rect #6-

Hous 13-on Ref. Planer.

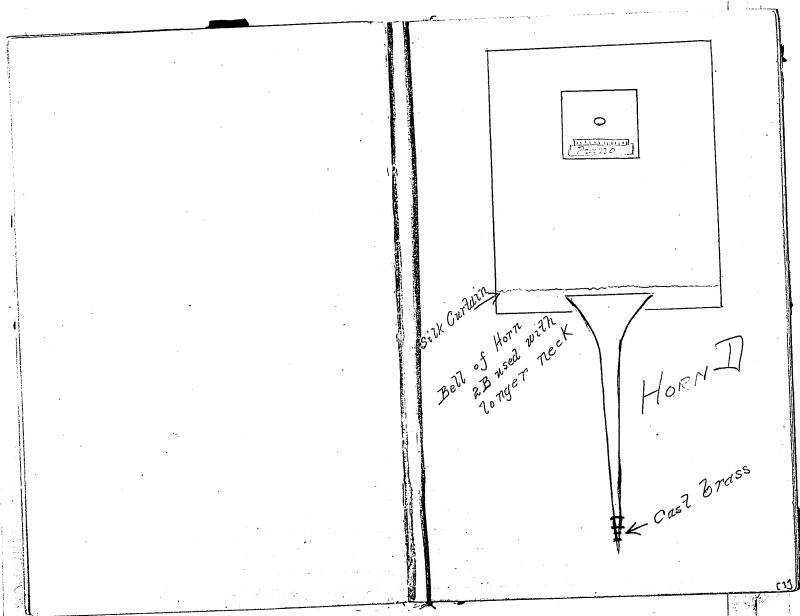
Hous on Recordings. W. W. C. 6/11.
3 1/2 in. dia.

[ITEM(S) FOUND IN BOOK]



**Notebook Series -- Notebooks by Edison and Other Experimenters
Recorder and Recording Experiments -- Miscellaneous Books
Notebook, N-16-11-13**

This notebook was used by E. Rowland Dawson during November 1916-February 1917 for notes on experimental recordings. The entries contain details of the recording sessions, including weather conditions, and numerous entries either quote or paraphrase Edison's comments and opinions. Also included are notes relating to voice trials for a sextet to be organized to make experimental recordings. Some of Dawson's comments indicate skepticism about the usefulness of these experiments. The notes indicate that William A. Hayes and Absalom M. Kennedy worked with Dawson on some of the recordings and recorders. The second part of the book [not selected] includes a list of disc prints from August-September 1921 and entries on pianos, harps, and other musical instruments used at the recording studios from 1922 to 1925. The label on the front cover is obscured by tape. The pages are unnumbered, and several pages have been removed from the front of the book. Approximately 60 pages have been used.



Nov 13

Test of diameters of heads
using interchangeable diaph-
ragms on different heads.

The same diaphragm is used
in all three cases, recorders
transmitters etc being changed

$\frac{3}{8}$ inch head much better
in quality than $\frac{1}{2}$ inch
also a trifle louder in
volume

$\frac{1}{2}$ inch not as good as $\frac{3}{8}$

Mr Edison say $\frac{3}{8}$ " is
the right one

Nov 15

Test of Mica Diaphragm
against Paper Diaphragm

Using same heat first
mica diaphragm than
paper.

Mica proved better in
quality and volume.

Note. - This is now damp
day and paper diaphragms
do not show up as well
as they did last week on
a bright day. This would
not change the verdict how-
ever. Mica is the better

Nov 15

Test of Gaskets of Different
Thicknesses.

Using $\frac{3}{8}$ inch lead throughout
and paper diaphragm

.005" .010" .015" .020" .025" .030"
.037" .045"

.015" the loudest.

Quality much the same, but
proving slightly with greater
depth

Mr Edison says .020 to .030 is
best

Nov 13

Test of Effect of Temperature
upon Records

Studio was very cold and
damp and records very
weak sharp and dis-
agreeable

After heating to about
75° another record
of the same piece same
recorder and conditions
was made

Record was 75% louder
and quality much improved

Nov 14

Test of distance from Recording Horn in Booth.

Quartet sang at 3, 6, 9
12 and 20 feet.

Mr Edison says very slight
difference between 3' + 6'. To
us there was practically none

at more than six' dis-
tance was noticable but
was fairly loud at 20'

Mr Edison says "I will
get the symphonies all
right." The horn seems
all right but you must
get more sensitive recorder"

Nov 15

Miss Bicknell making test
record blasted on high
notes at three feet.

At six feet record did
not blast but was just
on the verge. However
her placement was better
when singing at six feet.

#130 aluminum dome made
for the old horn proved better
than any other recorder.

Nov 16

Signor Bill Haynes joined us today, and we tried one of his recorders against our own and found recorders we now have are more sensitive than present commercial recorders. However Mr Edison says we must get one more sensitive

Nov 17

Test of wrapping horn
with cow hair.

(a) Test with both bell and
neck of horn pretty thoroughly
wrapped.

(b) With neck thoroughly
wrapped and bell free of
cow hair.

(c) With part of neck
wrappings off, leaving neck
wrapped only in spots to
break up nodes.

(d) With horn entirely
free of cow hair.

We find a more solid and clean
(2) with more of room tone about
equal in volume

Nov 18

Wrapped neck of horn
thoroughly with cow
hair even the cast
brass section.

Kept same in
this manner during
voice trials Nov 20, 21 &
22nd.

Getting new recording
and new reproducing
machines ready.

Nov 20, 21, 22

Mr Edison ordered a
sextet organized.

Called on Mr Chas. H. Drake
of Wolfsohn Bureau, Mrs
Charlotte Babcock, Townsend
H. Fellows, 815 Carnegie
Hall, Mr Boone of
Criterion Bureau, and
Mr Anderson and told
them we would hear
voices on the above
dates.

133

In all we have to date received and recorded 64 applicants and there are several to come. We gained for ourselves three very busy days and are no doubt richer in experience. We now have 64 records from which to choose voices to do test work of doubtful value.

Nov 23

Noticed standing in back of reproducing horn, tone sounded much clearer and diction was very much better

Placing Mr Edison's stand for listening in front of reproducing horn with the horn going into the reproducing horn, brightened and cleared the tone, and helped the diction

Reproduced through old devil crab horn and found it sharpened and cleaned the tone, but was not as rich in quality

Nov 24

Kennedy, Miss Longwood
and I weeded out the
64 trails of voices
which we had taken,
reducing the total
number for him to
listen to to 12.

Compared blue violin record
to wax of same thing, made
in same way, at same time
and under same conditions.

Found the blue brighter
sharper and cleaner. Volume
about the same. Improves
the quality, I should
say.

Nov 25

Mr Edison listened to the 12 trials which we had picked out as the best.

He gave them fairly good ratings and then asked to hear some of the others. I played some, telling him they were second best. He thought them pretty "rotten."

"Well, I guess you have them all right," He said after hearing a dozen or so. I asked him if he didn't want to listen to some bad ones. "Don't these bad ones?" "No, they are second best." "Well they are bad enough."

We got a sextet accepted

Nov 25

Mr Edison approved wrapping
the horn entirely.

Gave him tests with horn
unwrapped neck partially
wrapped, neck entirely wrapped
Neck and bell both wrapped.

"I can hear it getting better
right along as you come up.
The horn wrapped is clearer
and firmer. Not much
change in volume."

Dec 1/16

We have written sketch to report Monday, consisting of

Miss Rohmann,	Pop
"	Good.
Mr. Sawy,	Con
"	Ten
"	Berth
"	Winkel
"	Bar
"	Myers
	Baro

Per che? Lok weiss nicht.

Recorder 107 which is armless tempered aluminum remains unbeatable. It is made like 129 + 130 of last winter. It appears we can also use recorders of smaller diameter on this horn.

$\frac{3}{4}$ inch recorder of 107 type should be a winner

Dec 4

Seattlet began operations today.

They are six congenial persons, Voices blend well and they are musical.

They are on much higher plane than anything heretofore. Too bad there isn't a more definite purpose connected with their work

Dec 11

In order to get tests exactly in the same manner, decided to use disc machine on cello stand in recording booth directly under G, replacing vocal and instrumental tests.

Mr. Brown decided Miss Skolnik was not needed here except in the orchestra and that she was not to continue except on these days.

The orchestra is summoned for Wednesday:

Concert Master	Miss Skolnik
II Violin	Mr. Shifman
Viola	Mr. Shifman
Cello	Mr. Shifman
Bass	Mr. Shifman
Piano	Mr. Shifman
	Mr. Shifman

Mr Tushnett writes today
he is in Boston and will
be there with Musical show
until Christmas. He sug-
gests Mr Perry's Libretto
617 2: 198 It is substi-
tute until that time. He
wrote Libretto to come.

There are at last signs
of bringing these recording
experiments to a head, and
it can't be so too soon.

I am going to stay to the
finish but can't see why
that shouldn't be by Christ-
mas. The new horn
is in many characteristics
different

from the present disc.
regarding and whether he
likes it or not, Mr Edison
ought to tell by 11.30 times
and then there are three
courses open:

- a) Build another house
- b) Start making common sense
- c) Cut it all out

Unhappy

Dec 22

Orchestra and sextet worked several weeks. Bill Hayes recording got them up to commercial volume and records stood out. We were working principally for loudness and worked as near horn as possible.

The sextet was fine and we congratulated ourselves, but Mr. Edison's verdict was "Rotten, your recording has deteriorated 200%".

Said we were working too near the horn and his evident desire is to

make records from the middle of the booth and yet have them loud. It is an almost impossible task but that seems to be our problem. The quality is unquestionable, better from a distance and ensembles blend better but the volume at 8 feet is very weak still.

We have suspended the sextet and orchestra to try and get more sen-

sitive records.

Bill Hays has been
recalled from here.
The "Old Man" said Bill
him over there just to
do what according you
wanted. Kindly. "He
has done a little more
than that." "I'll bring
him back then."

Jan 2, 1917.

At New Year's we can certainly duplicate what we did last winter and show some improvement. We cannot however retain same quality, and make records stand out as the disc records do, nor can we record from the center and back of the booth and have records sufficiently loud as Mr Edison seems to want us to do.

It looks like an impossible task upon which he has set us. Impossible

at any rate to conventional
recording methods. If the
deed is to be "did" it will
be by something very
radical in my opinion

Jan 12

I have often wondered what becomes of sound waves after they hit diaphragm of recorder. It has always seemed to me there was no outlet other than back through the horn, and the struggle for freedom of the returning waves against the incoming waves must have been frightful in the wave world.

It has always seemed to me an expanding chamber in the recorder would ~~cancel~~ eliminate some of this fight by giving it more room to spread out in.

Kennedy is now trying such an experiment. The results so far seem to show a spreading tone rather than a concentrated resonant one.

I had imagined the result

would have been just the
opposite.

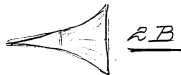
It now appears that waves
after striking diaphragm
do not come back through
the horn but go right
on through the diaphragm
and arm and what waves
are not killed by friction
etc go on into space.

Jan 17

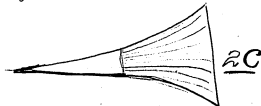
Following is outline of the horns we have tried and the way they have been designated in notes.



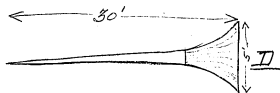
Neck of original #2 horn with large flare added.



Which is twice the size of RA and of same shape materials etc



Which is twice the size of RB and of same shape materials etc



Which has the bell of RB
with a long gently tapered neck
replacing neck of RB

Dimensions - Length of neck 20 feet
Diameter where neck and bell join
14 inches

Diameter of bell - 5 feet
Length of bell - 4 feet

The small end of neck has 4
feet taken from old brass horn
thus making a firm extremity to
the thin brass of the neck.

Jan 19/17

Kennedy has succeeded in getting aluminum rolled to less than $\frac{1}{2}$ thousandth of an inch, which seems to be promising, so promising in fact that he has a "systematic" scheme for building diaphragms out of it that at the pace we are going will take several months.

After this there are electroplated diaphragms of a million or so varieties to be tried. By which ~~the~~ numerous other opportunities for experiment on diaphragms will no doubt have presented themselves.

By the time we are ready to do something, it will be bed time in eternity.

My suggestion in the fall of adding more mechanics would have had this field covered before this.

Jan 23/17

Last week I wrote Mr. Edison telling him my candid opinion of what we have done so far and what I thought we ought to do now.

In brief I thought present horn admirable for big orchestra and large choruses but that a smaller horn would produce better results for solos.

I suggested we get 15 violinists out for a day or two and let them play in unison also that we get a church choir out for a day, in order that we could get some idea of what we can do with a big crowd.

Suggested we ought to try the disc also.

He has paid no attention to the note so, while he may have given it some thought, evidently my opinion is not wanted so hereafter I feel I should do what I am told - no more, no less.

Feb 11/17

Met Mr Edison and he told me "damn in a hell of a mess" and am afraid I'll have to close up over there until I get free and can come over myself. I am going to Florida next week and I don't know now when I'll get there but I'll make things move when I do."

Later we played some records for him and while he didn't like the recording, he said nothing about closing, but I am sure he hasn't forgotten it.

Our recording is much brighter and has a great deal more life and pep than the disc and eliminates the extra fullness the disc has

I am convinced the quality
we were aiming for and
approaching in our recent
records would make the
Edison phonograph as adapted
a genuine competitor of the
Victor, with the addition
of course of a large catalogue
of records.

**Notebook Series -- Notebooks by Edison and Other Experimenters
Recorder and Recording Experiments -- Miscellaneous Books
Notebook, N-20-00-00.3**

This undated notebook was used by Edison and Absalom M. Kennedy, probably in 1916, for notes on experimental recordings and tests made with various numbered recorders. The entries are by Kennedy with additions and comments by Edison. The front cover is labeled "Mr. Edison Notes - Columbia St. Studio." The pages are unnumbered. Approximately 15 pages have been used.

Tract of Records

9 { #132 Model 100
#100 102
#129 95 plus -
#103 110 -

6 { #130
#100
#118

7 { #108
#132
#129
#103
#123

#108 102.

#130 100

#127 105 blubs

#123 100 blubs

#104 98

#118 115 blubs + scratches

#113 120 - best so far - Quality good

132 105 Standard -

131 108

102 102

134 108

109 108

121 102

{	*132	105
	134	102
	120	102
	107	115

{	117	102
	115	105
	107	102

{	132	105
	126	115@18
	128	110
	106	105

" Standard #63. 100 11mm

{ #132 - 175 @ 190 -

7 { #128 160 -

#126. 175 ~~at 190~~ @ 190

{ #113 "

18 { #121 "

#106

{ 105

19 { 130

129

Barnes &
Rachtauwchen
good passed

Volga Song - Mirlitons
fair -

Diving Song - Barnes
No

Santiago
get this - good -

Norwegian Slumber Song
No

all Gaynn
Dances -

MO

Estudiantina
good - w/ q & x

Invitation to the Dance x
↓ to good but 1st part adriant
instruments different

Piccolotto adriant Butterfly
good -

La Zingana
good.

Sari Walz

No -

Blue Danube Walzes

good - get it

Italian Suite I

No

Italian Suite III & IV

No

Kennedys Song

first part beautiful

Wedding Dance

NO -

Anthony & Cleopatra
facts good. Violins & cello
stronger than fundamental in
most of the tunes - in this
its very bad -

Anthony & Cleopatra II

not played right -

Chinese Wedding March

good - think got it

Carmen I
quod - get it,

Ballet Egyptienne

quod. just it Mente

Nest of Boobies
 Pianos at 13 ft
 Back covered with feet. 6" x 10" opening

100 — 100%
 102 — 100
 103 — 103
 x 104 — 90
 x 105 — 92
 106 — 100

107 — 100
 108 — 102
 ✓ 109 — 105
 110 — 103
 ✓ 113 — 105
 114 — 103
 115 — 102

117 — 101
 ✓ 118 — 105
 x 120 — 95
 121 — 100
 123 — 101
 126 — 105
 127 — 105

128 — 104
 x 129 — 85
 130 — 102
 131 — 102
 132 — 103
 50 — 103

Test of Reorder with Dublin

#100 — 100
 102 — 103
 103 — 100
 x 104 — 100
 x 105 — 100
 106 — 100
 107 — 100
 108 — 101

109 — 100
 110 — 101
 113 — 101
 114 — 101
 115 — 101
 117 — 103
 118 — 104

x 120 — 100
 121 — 102
 123 — 101
 126 — 101
 127 — 100
 ✓ 128 — 102 @ 3
 x 129 — 101

130 — 100
 131 — 102
 132 — 103
 50 — 102

Harmonium Test
 Recorder #113
 Distance 7'

① Without Reflector 102
 ② With Reflector 106

Jewlin Test
 Recorder 133
 Distance 10"
 ① Without Reflector 100
 ② With Reflector 100

Comparison Large Small Horn

R 118

Distance = 12"

① Violin with Large Horn - 100

② " " #7 Horn 100

**Notebook Series -- Notebooks by Edison and Other Experimenters
Recorder and Recording Experiments -- Miscellaneous Books
Notebook, N-17-01-06**

This notebook was used by Absalom M. Kennedy during January-February 1917. The entries consist primarily of daily logs of experimental recording activities at the Columbia Street Studio using various kinds of music and recorders. Included are comments on the loudness and quality of the sound. The determination of quality was based partly on "tone tests" in which a performer's recordings were compared to a live performance by the same individual. The notes indicate that Edison oversaw the work and periodically listened to the experimental recordings and that E. Rowland Dawson and Clarence B. Hayes assisted in some of the experiments. At the beginning of the book are two pages by an unidentified author noting the numbers of blanks on hand. Inserted into the book is a three-page handwritten list by Kennedy with entries numbered 1-27, along with a related typewritten list. The front cover is labeled "Notes, Columbia St. Studio from Jan. 6, 1917." The pages are unnumbered. Approximately 40 pages have been used.

Blank

Nov. 24th

In hand 19 B.T. Waller, Linn.

Nov 24th

In Nov 263 Trial Blanks
including experiments held for
in Edisto

1/6/17.

Trials of #0 head expanding
against #3 " ~~contracting~~
taper.

Showed conclusively that the
expanding head was louder,
fuller & richer sound.

Which disc machine at 6' did not
make as much difference as at
4'

Dawson showed me Bartovien's
Funeral March made here and
in #4 Reg. Farmer is better
in quality & naturalness than
former and in the musical
arrangement - as the latter
sounded staccato beside it
not in keeping with a funeral
march at all.

Made record of all records
for Mr. E.

Must get machine ready for him
when records on.

1/8/17
Orelin

① 100		100	100
② 104	Sharpen	105	110
③ RB-Head X		100	100
④ RB-Head Y	Sharpen	110	110

The above tests are to show the
influence of expanding taper head.

In both cages they show

- ① Superior endurance
- ② Less tendency to blast
- ③ Greater firmness
- ④ Greater sharpness
- ⑤ Greater "stand out of horn".

voice

① Ring B-Head Y	110	90
Ring B-Head X	100	100
Ring D-Head X	100	100
Ring D-Head Y	100	105

The above test does not
hold out on voice as
with wire,

RA - Head X
RA - Head Y

100	100
90	90

This entirely reverses tests made the first time that the expanding head made the periods bolder & sharper. In this case the contracting head showed bolder & fuller than the expanding.

Quartile at 5'

① Ring B Head X
② Ring B Head Y
① Ring D Head X
② Ring D Head Y

100	100
110	90
100	100
105	110

Above results contrary.
must work over to prove up.

1/9/16

100

3

7

B

* A

100	100
120	100
90	110
90	120
85	100

Ring 3 shows up louder than 100 but similar in quality - sharp.

Ring 7 is not as loud, but good full quality.

Ring B shows less surface than any not quite as loud as 100 but excellent quality.

Ring A - not as loud as any & not extra good quality. Need to turn up.

Ring A Head X

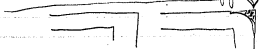
Ring A " Y

Ring C " X

Ring C " Y

100	100
100	95
100	100
90	95

Poured wax in head & to round off back edge



Violin
Ring A Head X

100/100

Ring A Head Y

110/110

Voice
Ring A Head X

100/100

Ring A Head Y

115/100

It is evident that filling in with
vocal improves these expanding
taper records.

Voice
Ring D Head X

100/100

Ring D Head Y

125/125

Shows up superiority of this head
even though Dawson was not
singing as well in second case
as in first.

Violin
Albani ~~that~~ made showed head &
louder & on tone but trife more
natural.

Phonograph
Ring D Head X
Ring D Head Y
Dawson stands out better.

100/100

115/110

Voise Dawson

Ring 3 Head 0

Ring 3 Head 2

100/100

120/120

1/10/17

100	sharp - loud - stands out	100	100
E	Does not stand out as well - fuller	100	120
* A	Full of noises - rattles	90	—

Ring E - Head X	punched,	100	100
Ring E - Head Y	light ^{from above} cattle	100	110

Tried tone test on above. Head Y shows very much more natural.

Contrasting Recorder # 130 with

No B			
130	Sharper - stands out more	100	100
B	sweeter		

Violin & Piano

130	sharp -	100	100
Ring B - Head X		85	110
Ring B - Head Y		100	125

Volume by Listening
Quality by tone test

Price - Dawson

Ring E-Head X
Ring E-Head Y

100/100
120/125

Volume compared by listening
Quality by tone test.

1/11/17.

Tried out new heads A & E. A was reluctant same as A of yesterday except that a heavy coating of phellac was put over the disc and around edges so as to firmly bind this disc to the diaphragm.

E was disassembled by taking off arm & foot, checking disc as above and rephasing arm & foot.

This seemed to improve both records as following test shows both quite high while they did not on previous day.

Comparative trials showed as follows.

#100
 a-x
 a-y
 E-x
 E-y

100	100
90	110
110	120
90	110
100	120

Then made tests of all readers
 with violin to determine one best
 for comparative clearing.
 Volume test regular
 Quality test by "tone test".

#100

A sharper & stands out more
 even
 better further back than C
 full
 sharper
 1-2-3-4-5-6-7-8-9-10
 11-12-13-14-15-16-17-18-19-20
 21-22-23-24-25-26-27-28-29-30
 31-32-33-34-35-36-37-38-39-40
 41-42-43-44-45-46-47-48-49-50
 51-52-53-54-55-56-57-58-59-60
 61-62-63-64-65-66-67-68-69-70
 71-72-73-74-75-76-77-78-79-80
 81-82-83-84-85-86-87-88-89-90
 91-92-93-94-95-96-97-98-99-100

100	100
115	120
110	115
115	110
110	120
120	115
115	110
110	110
115	120
120	120
110	115
115	110
105	115
105	120

11/12/17.

B-X
B-Y
B-Z

100	100
115	115
125	120

The Y head is much sharper than X or Z. Z is much louder & is the most natural.

In making these records the room was so cold it was necessary to heat the machine. This was overdone and the temperature of the wax was about 105°.

Compared B-Y made yesterday with wax about 65° and to day about 105°. Found that today records were louder & fuller.

Made test with paper diaphragm between nozzle and horn.

Records both on violin and on voice show that the paper not only thins & sharpens tone but

promotes blast on a resonant
note B² in this case.
Voice - Dawson -

DX		100	100
DY	coarser - sharper - more open	115	125
DZ	clean pure - true tone with the 11	165	180

Tone feeling above
X fuller than Dawson
if brighter or sharper than Dawson
if most closely approximate quality.

With Phonograph

DX		100	100
DY		110	120
DZ		115	120

Used the above record on
Standard machine in music
room. Results less marked to
me than the above.

Hayes gave DX best in "Uncle
Sam's" DX best more & DZ in another

Will try other reproducers on

① - 100-100 ② - 120-110 ③ - 150-80 ¹⁰⁰

machine in Studio and attempt
to determine where trouble lies.

1/15/17.

Test of new ~~Lead~~ Ring
#1 against #100

#100		100	100
Ring 1 - Head Z		60	110

Same to see whether head or
recorder makes difference

#100		100	100
Ring 1 - Head 4		50	110
Ring 1 - Head Z		60	120

Ring 3 - Head 4	100	100
Ring 3 - Head Z	110	100

Too cold for recording at
1:15 P.M. Temperature 58°

①	100	100	- 3
②	90	120	- X.
③	90	90	- 4
④	110	100	- 100

			Tone test	
100 - 100 - 100	①	- 85	X	
84 - 90 - 90 -	②	- 90	100	
8X - 90 - 120	③	- 95	Z	
83 - 85 - 110				

① - 100-100 chart.	2
② - 110-110 full rich.	100
③ - 115-115 not as full chords not better	④
④ - 115-115 about same.	4

3-4 - full muddy goes to pieces.	100-100
3-0 - louder chords & richer	110-115
3-Z - further back - less clear	90-110
100 - higher back does not hold down	100-105

11/17

Tried the following records and had them run in unknown order and rated as follows:

①	83	} Violin	100	100
	8X		90	120
	84		90	90
	100		110	100

Again Rating only on Quality
This tone test = 100 being perfect violin quality.

8X	85
100	90
83	95

- 4
With Voice (Dawson) not running which is which.

3-4	100	100
3-0	110	115
3-Z	90	110
100	100	105

		Bassoon	
①	100-100	BZ	92
②	90-110	O BX	88
③	95-110	O BX	90
④	85-105	O BX	96

		Test not knowing Violin -	True Sol
BZ	100-100		92
BX	90-110		88
BX	95-110		90
BZ	85-105		96

Comparing Presolved make on
Cory Kern RDN-g with large
horn R113.

Tested with violin, B-Z against
2-Z (Hayes just back). Found B-Z
not only better quality but
louder, particularly on the
higher notes.

This would seem to show that
we have improved the recording
and are ready for heavier trials,

- ① -100 - full
 * ② - 90 - stands out better using
 ③ -120 - sharper-

Out out A

1/17/17

Take up personal equation
in playing-

Tone Test

① - BZ	100	100
* ② - AZ surface	95	100
③ - 1Z	100	105

These bumps were made (A & 1) with .0005" aluminum in place of .001" as B which is best on violin.

Seems that the thinner does not make materially louder.

Voice

Tone Test Val

3 Z	80	100	100
* A Z Ropes Ropes Too much surface	110	120	
1 Z " " Full fine	95	115	125

This proves somewhat above
 On voice the thin aluminum is
 much nearer the true quality
 of voice.

Test on Miss Rushbinder

2Z

1Z Fuller.

100	100
120	?

? Based up better on tone test
this recorder is much fuller than
#3.

Further tests both on violin & voice
showed ping 1 to be loud & full.

on Lawrence's voice - 3 is a trifle
sharp - but makes it stand out.
2 is richer, fuller & holds better.

Miss Beatty has a "spotted" -
mezzo soprano voice which
changes quality & becomes fuller
especially on her high soprano
tones. For this reason 5 which
is sharp & holds was best for
her but did not even hold
perfectly.

Am encouraged with results
to day.

It is also evident that head
I makes records sharper &
louder & stand out more than
X or the old 3 we used before.

It is therefore possible to not
only lighten & make sharper
by different pumps but also
by different heads.

① -

①	champs	100	100
②	banjo + sharp + clean	105	110
①		100	100
②		95	95

2 P.M.

11/9/17

Dawson points out that recorder #5 of yesterday has probably loosened up & changed.

At first it was very weak and sharp. Then an violin record of Krumpholtz - Lander & Reed. On Miss Beatty listened somewhat.

Will try it out to day and see what it does.

		Dec	Jan
100	<u>Violin</u>	100	90
5x	sharp	90	90
5Z		90	85
5Z	<u>Violin</u>	100	100
5x	<u>voice - 4 ft</u>	105	110
5Z		100	
3Z		120	
5x		120	
3x		125	

Test showed that #5 recorder had not become noticeably looser than since first made.

Is firm and holds fine.

- Keep all sorts of banking.
The resultant records ~~are~~ when
made close are hard - and
stand out as no previous
records ever have.

0

1/22/17
Osslin

100	100	100
8X	90	110
AX - fuller -	85	115
EX -	80	105
EX - sharper & louder & sturdier	85	115
FX - loud full - some surface	110	115
IX - loud full - surface blast	110	110

Tone both same
fuller than voice

IX	85
EX	95
EX	90
AX	95
8X	85
5X	90
100	90

Voice Dawson - U'

100	100	100
IX	125	115
FX	125	115
5X	85	110
8X	90	120
AX	85	115
EX	90	120
FX	120	115

115

Dawson Voice - close up.		
5x	sharp.	100/100
8x	fine surface fuller - best further back	95/110
✓ E x	good - stands out natural	105/115

Further tests on voice and on violin playing. Reinisch showed the superiority of recorder E. This is almost if not quite as loud (close up) as #5 of last week and has much better quality - is clean clear & fairly full. Makes best records both of voice and of violin.

Tomorrow will test the pressed series (#1 and F) from distance for signature and use Reed K in place of X with them.

①
②
③

A
E
100

Tone Test

100 100
95 110
105 110

85
95
85

1/28/17

Tested new register A as follows
Violin

100 100-100
EX 92-110
AX 95-102

Violin on Russian

100 100-100
AX 110-90
EX 95-120

Comparison AX & AZ

AX - 100-100
AZ - sharper cleaner & better 110-110

Same on O size. str. 4'

AZ - 100-100
AX - better, - cleaner - 105-110

Then tightened head A.

On violin, notes better, becomes
sharper & cleaner & holds.

On voice, very much better, cleaner
& better definition.

Violin & Voice

* AX tightened
EX

100-100
110-120

AX does not equal EX
either on violin or voice.

Made tests of recorded E on
Miss Buschlinger. Found that it
is natural & good.

Made comparative tests of
rings E & A with on voice &
violin. On voice I showed
little and was not so clear.
On violin got curious effect.
E brings out the violin's
makes it clear, clean, prominent
and natural and makes the
piano back. I makes the
violin no longer but brings
up the piano making it much
louder than before.

I believe that E quite
show the effect of distance
much more than F or similar
free records.

1/24/07.

Tested out perc. drums as follows:

100	100
EX	95 105
AX	90 105
S	90 120

Yone Test-Diekin

100	85
EX	95
AX	90
S	92

Deice-Tamson.

100	100
EX	90 120
AX	85 125
S	95 135

Tone Test:

100	85
* EX	92
AX	95
* S	97

Salesman at Boston machine in
music room offered 2 better than
S. 3 too good to back.

Comparison E & S on a piece
Muscovite - E is louder, sharper
sounds out better, S seems to
be quieter, fuller & more natural.

Comparison E & S on a piece
of Nibs Muscovite - E is
louder, sharper, S seems to
be quieter, fuller & more natural.

Thought for hope that the
musical sounder might
show better distance effect.

at 8'
E-100 - F-120 S-110

at 4'
E-100 F-120 S-113

at 1'
E-100 F (phils) 125 S-110.

1/25/17

Tests of 5 recorders with small
tube against large tube.

Voice

With the large tube the sound is
louder, clearer & carries out
better. With an improvement.

Notes

Same present - the sound is
louder, clearer & stands out
much better on the large
tube.

Tests of 4 recorders

with small tube

Voice

E. - little louder in clearness
and carries out better. E is
better quality.

Notes

E shows up much louder on
this clearness & very natural
in tone quality.

Voice

E shows up louder, clearer
& better here also.

Order

Ring EX

EX Little Lumber	100	100
EX full than E	90	105
EX full than E	95	95

10000

EX

AX

8X

100	100
90	105
95	110

Back of new wing

AX Little Lumber	100	100
AX full than E	90	105
AX full than E	95	95

AX regular

AX loosened

100	100
102	105

AX regular & full than E
loosened with leaving the same
generalness of form.

①
②S
E

Violin

100
90100
90

Voice

①
②S
E100
95100
110

1/26/17.

Had records I made up so
that the hole moved $\frac{1}{2}$ "
up and down which we
have.

On test with violin and with
Sausage noise

Violin

S

100 100

EX

90 90

Voice

S

100 100

EX

95 110

A number of records made
previously and today were taken
over to the music room to
compare on machine there.

They showed as follows

S, small hole
S, large hole
S, $\frac{1}{2}$ " hole

100 100

120 100

110 105

Comparing D. & E on
voice & violin showed S apparently
the better on violin, but E the
better & louder on voice.

(11)

1/31/17.

Damon made up two new recorders. Both whistled on test.

Tested #1 Recorder, made of softened .0065" aluminum, as follows:

100		100	100
1X	(blew)	80	105
1X tightened	surface-sing	87	110

The recorder however is way back in the horn & weak & dead. The quality is good but volume is weak and sounds too far back.

On tightening up, became firmer and a little louder, but developed a slight whistle or squeal which shows as surface.

There is one curious feature to these ring recorders that I do not understand. #100 a head recorder is louder than any of them. Is it possible

that, as some of the first
 results seemed to show - that
 the head recorders are louder
 than the ring recorders - it is
 it that the straight head,
 even on a trunnion not
 designed for it, producing
 an expansion chamber, is
 louder than the more carefully
 carried out ring recorders.

- Check this by testing out
 the regular recorders with
 ① Straight trunnion and nozzle.
 ② Tapered trunnion and nozzle.
 ③ Against similar ring recorders.

Test of Recorder #100 with
 tapered trunnion against straight
 trunnion

100 tapered trunnion	100	100
100 straight trunnion	110	80

In this the tapered trunnion was
 not quite as loud as the straight
 trunnion but was firm & true.

and heads. The ~~straight~~
 trunion was louder but beaded
 on powerful notes - was not
 so good in quality and went
 to pieces.

Companion dead 4 on
 straight trunion, tapered
 trunion & same recorders
 on head X.

1	R3	Dead 4 - St trunion	100	100
3	"	4 - Tapered trunion	90	110
7	R3	" X - "	95	115
3	R3	" 4 - St trunion	100	100
1	R3	" 4 - Tapered trunion	105	110
7	R3	" X - "	100	105
3	RE	" 4 - Straight Trunion	100	100
1	RE	" 4 - Tapered Trunion	102	115
7	RE	" X - "	100	100

Recorders 3 & 4 have changed
 On former tests 3 was sharp
 & fairly loud, now it is full
 & louder than 4 and in every way

better.

It is evident that the tempered aluminum is not right - is good quality but not enough spring and come back to make the pond live & lively.

2/1/7.

Comparison and records

100

① AX

8X

Surface

Blue. Too sensitive

100

100

10

100

110

70

② AX

100

Too sensitive, Fine surface

Blue-

100

100

100

100

① A. showed too much surface - found needle to have been broken off.

② Replaced needle & found too sensitive

100

3X

107

2X

100

100

90

120

85

120

75

125

[ITEM(S) FOUND IN BOOK]

- ① Sopranos, tenors and baritone scales showing correct and incorrect scales & notes.
- ② Compare correct & incorrect opera recitations.
- ③ A cylinder record showing very faulty interpretation.
- ④ Compare Anna Case's faulty sustained notes also pure sustained note & tremolo on sustained notes.
- ⑤ Records showing sudden change in timbre. Indicate by light or heavy music mark.
- ⑥ Compare sharp & full & mellow voice on same piece. "Have blackboard showing drop in overtones.
- ⑦ Chart showing scales of some of our singers, photo micrographs of these showing overtones.
- ⑧ Records of true notes with tremolo or one or two tremolo notes.
- ⑨ Chorus singing in pitch & out. Use ours with & without tremolo.
- ⑩ Show by chart what a beat comes from - 1, 2, 3 & more
- ⑪ (2)

[ITEM(S) FOUND IN BOOK]

- (12) Have Nernst duplicate a well known song backwards.
- (14) Rig up chronograph to record personal equation
- (15) Model of larynx - vocal chords show they work - also mechanical illustration show schemboly irregular larynx
- (16) Rig up diaphragm with mirror to which mirror to show volume of sound.
- (17) Show model diaphragm, diamond soft board on edge of which is waves.
- (18) ?
- (19) Show mechanical timbre in vector
Tree acoustics in para.
- (20) Show very poor & very good scale
- (21) Illustrate uneven singers - one who on some notes blasts - another who is even throughout.
- (22) Record with perfect contrasts, mezzo sopranos, sopranos, coloratura, basso, bass-baritone, baritone, high baritone, tenor, paces to length practice by.
- (23) Record in German, same man in Italian, same in all vowels.

[ITEM(S) FOUND IN BOOK]

3

- (24) Illustrate Pinch & Judy characters to ~~appear~~ by own speed & contracts by underspeed.
- (25) Have two phonographs one regulating correctly other not - to illustrate.
- (26) Have cylinder recording machine to take scales from audience. Preserve good ones & send to Orange. Have Piano.
- (27) Chart illustrating waves of trombone, cornet, clarinet & all instruments. Show fundamental without overtones other both superposed.

[ITEM(S) FOUND IN BOOK]

Get after Hayes.

[ITEM(S) FOUND IN BOOK]

Kennedy

- * 1 - Several Soprano Solos from Foreign Post, also Tenor & Baritone - if Werner can ~~displace~~
- * 2 - Rejected Opera pieces for illustration, also ours & Regular.
- * 3 - The Cylinder record for Zero. ~~Interpretation~~
- * 4 - Anna Ode sustained, also Newark woman in Ave' Maria on sustained & compare with bad sustained, tremolo.
- * 5 - Records showing sudden change of timbre. Have the music & mark the part so audience knows when it comes.
- * 6 - Records showing a sharp Voice & same tune, if possible a mellow Voice. ~~Have black-board showing drop of overtones.~~
- * 7 - Chart showing scale, notes as record looks under Microscope with overtones, many of our singers.
- * 8 - Records showing no tremolo on most all notes & then one or two notes with tremolo.
- * 9 - Chorus singing where they sing to pitch & where they do not. Use our & Victor's with & without tremolo.
- * 10 - Show by chart what a beat comes from - 1 beat 2, 3, & more.
- * 11 - Have one of our singers start every note full strength & cut off sharp - then another rising for interpretation.
- * 12 - Sing a well known song in even monotonous volume, then another proper inflection, then another dramatically.
- * 13 - Werner ~~has~~ a well known song backwards.
- * 14 - Rig up a chronograph to record personal equation.
- * 15 - Model of the Larynx - Vocal chords, & how they work - also a mechanical illustration, Show Hermann's artificial larynx.
- * 16 - Rig up the diaphragm with mirror to show volume of sound.
- * 17 - Show Model diaphragm, Diamond & 6 ft. board on edge of which is waves.
- * 18 - Record sung in ~~trio~~ sung solo, sung Regular way.
- * 19 - With Victor, illustrate mechanical timbre & same tune with ours, show effect of suppressing mechanical false waves & adding overtones.
- * 20 - Show a very poor scale & a very good scale.
- * 21 - Illustrate an Opera song where volume of sound is uneven, & some notes so powerful as to throw recording mechanism out of gear, while another Opera singer gives even volume.
- * 22 - Records with scales perfect, for Contralto, Mesosoprano & Soprano & Coloratura, Alto, Bass, Baritone, Tenor - To sing to & practice by.

[ITEM(S) FOUND IN BOOK]

- # 23 - Record in German, same man in Italian, same in all vowels.
- # 24 - Illustrate Punch & Judy Character given by speed & Control like by less than speed.
- K 25 - Give song with two phonos. reproducing simultaneously one only adjusted. ✕
- K 26 - Have Cylinder recording machine & take scales from audience, Save those which are good & send with memo to Orange - Have piano at lecture. ✓
- 27 - Illustrate Chart of waves of Trombone, Cornet, Clarionette & all the instruments. Show fundamental waves without overtones, & then side by side, the same waves with the overtones.

Apparatus

4

- 1 - Phonograph
- 1 - Phonograph
- 1 - Phonograph

(28) Delusion Experiment: Violent screams
loud and sharp. Phonograph continues
same with voice.

[ITEM(S) FOUND IN BOOK]

Mirror - 12 -
 Dressing Room - 12 -
 Table - 12 -

**Notebook Series -- Notebooks by Edison and Other Experimenters
Recorder and Recording Experiments -- Miscellaneous Books
Notebook, N-19-01-10.2**

This notebook was used by Edison and Walter H. Miller in 1919-1920 for notes on experimental recordings. Some of the experiments took place at the Columbia Street studio in West Orange; others were performed at the Edison company's New York studio. The early entries include substantial comments by Edison. The later entries are all written by Miller, with occasional notations regarding Edison's opinions. Some of the experiments involved the use of a 40-foot horn. Inserted into the book are numerous loose pages of comments by Edison, some of which are summarized by Miller in the book. Most of Edison's notes indicate the page of the notebook to which he is referring. These notes appear on the microfilm immediately following the page to which they are keyed. In addition, there are six loose pages of notes by Miller, which refer to six experiments (#823-#828) at the beginning of the book. These notes appear on the microfilm immediately following the relevant notebook page. The book contains 144 numbered pages, some of which are blank. Several pages were removed from the front of the book prior to pagination.

Please return this
book to

Walter H. Miller
Edison Laboratory
Orange

N. J.

Long horn later $\frac{17}{32}$ to foot

New	End piece for Reg was	$\frac{14}{16}$	to foot
"	" " for 5/8 Reel	$\frac{12}{16}$	to foot

1) Harris used Exper #826

Experiment 826 Columbia & Studio

826-A If we call 1 ft 100 loud

Notes -

1 ft is about $\frac{1}{3}$ as loud as we need to get it showing a very sensitive recorder - it should be twice as loud

2 ft - 75

3 - 65

4 - 60

5 - 59

6 - 59

7 - 58

8 - 58

9 - 57

10 - 57

826-B

Notes - Has bad flubb or jump or flutter on one base note. It's $\frac{1}{2}$ the strength it should be for regular work

1 ft 100%

2 - 85

3 - 80

4 - 78

5 - 74

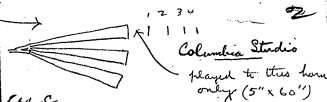
6 - 72

7 - 70

8 - 70

9 - 70

10 - 70



826-C flute

1 - 100

2 - 95

3 - 60

4 - 50

5 - 45

6 - 40

7 - 43

8 - 40

9 - 38

10 - 32

has $\frac{1}{2}$ Val it should have -

My ear not good for high notes

826-D

Bello

1 ft 100

2 - 75

3 - 70

4 - 68

5 - 66

6 - 63

7 - 60

8 - 57

9 - 55

10 - 52

only $\frac{1}{2}$ loud enough

Horn was for
Vini Zwartelle



1 2 3 4 5 6 7 8 9 10

| | | | | | | | | |

Rea #68

Round tests of Violin, flute, Cello Harp
in x horn, each separately at Col Studio

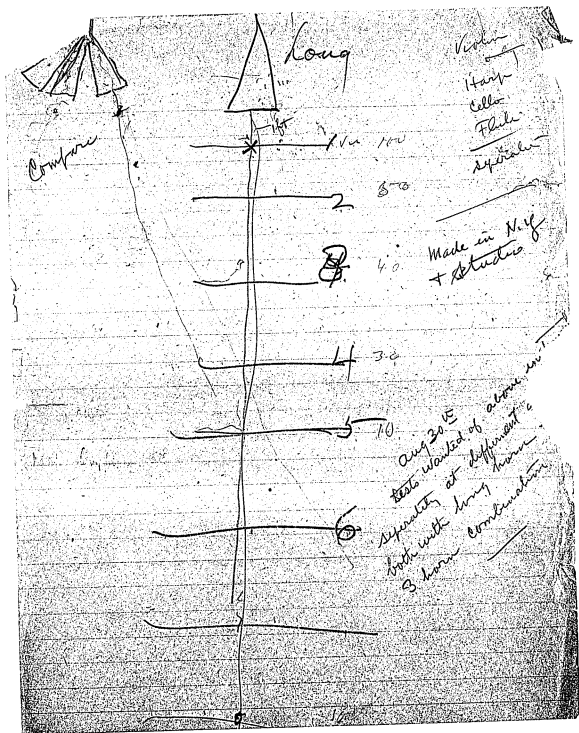
Ex ✓ 826 ✓

826-A
Violin

826B
Harp

✓
826C
flute

✓
826D
Cello



Make long horn in studio - all instruments

" 3 horns in " all "

" 1 violin in " " "

N.Y.

Make violin in long horn 12' bell

" " in short " 12' bell

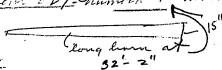
" " " " " long horn

" " " long " " "

Make horn in long horn

3

Experiment 827-Gundwin 4 Guides



827-a

Kirlin

1 ft.	loud enough	100
2	"	90
3	not loud enough	80
4		70
5		65
6		62
7		60
8		57
9		55
10		52

827-B

Kirlin

1 ft	loud enough for Ray
2	"
3	"
4	"
5	"
6	75
7	72
8	70
9	68
10	65

One note
Kirlin, flutten

4

for Orchestra 4 to 6 ft away
will be loud enough
& for solo as noted.

827-c

Kirlin

1 ft	loud enough
2	not loud enough
3	60
4	57
5	55

Rest about same & allow foot
after 1 ft - He don't play
with same volume each time

827-d

Kello

1 ft	loud enough
2	"
3	70
4	65
5	62
6	60
7	59
8	58
9	58
10	55

Long Horn Col. Studio

Alto #68



1 2 3 4 5 6 7 8 9 10

Record tests of Violin, Flute, Cello, Harp
with above horn at Columbia studio
at different distances - each separately.

Ex 827

827-A

Violin

827-B

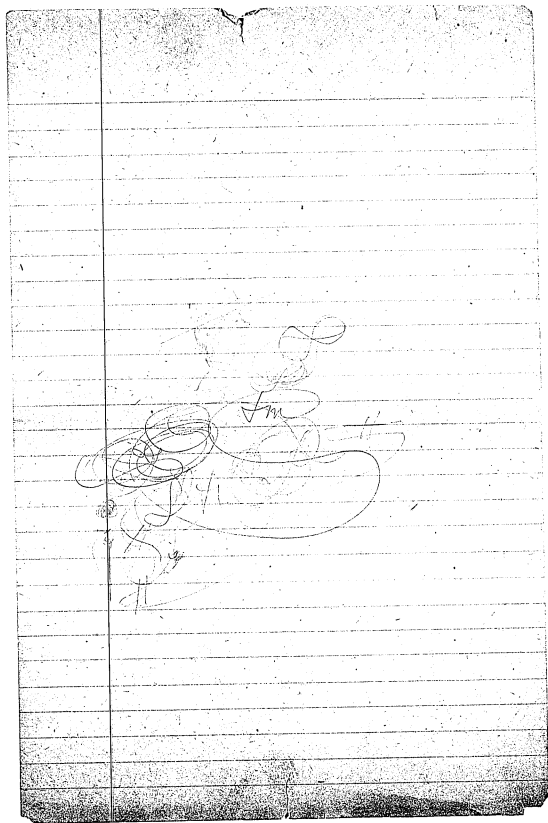
Harp

827-C

Flute

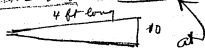
827-D

Cello



5

Experiment 848 - Glumkin & Gaidis



848-A

when

1 ft

2

3

4

5

loud enough,
90%
75%
60%

50% of original 4' ab

848-B

Harp.

848-C

flute

848-D

cells

Walter - The 3 horns are
Very Weak -

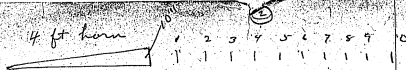
Long Horn loudest,

Short Single horn

not so loud as long horn

No room or hollow sounds
Quality same far away as it is close

6



Rev # 68

Record tests of Violin, Flute Cello + Harp with
above horn at Col Studios at different distances
- Will show comparisons of long + short horns

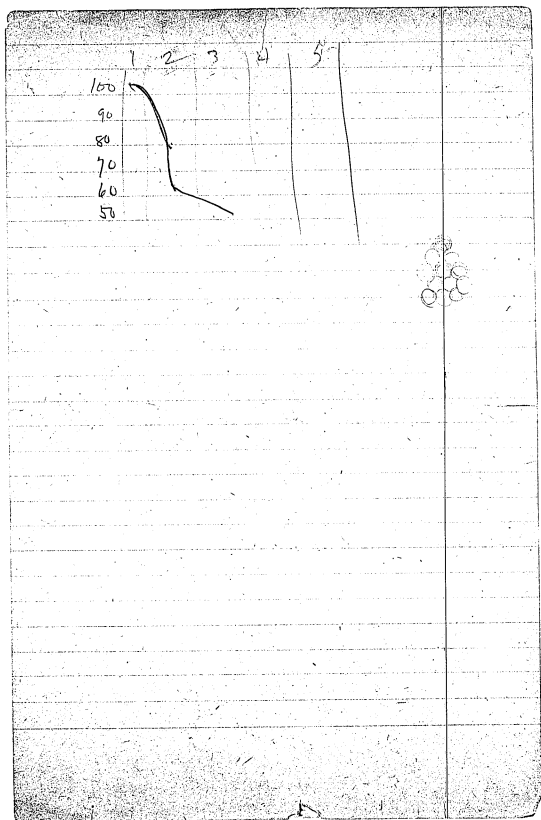
Ex 828 ✓

828-A
Violin

828-B
Harp

828-C
Flute

828-D
Cello



7

Experiment 823 - N.Y. Studied Padded



823-a

flute

1 ft
2
3
4
5

loud enough for solo

"

75

60

50% of loudness

823-b

flute

1 ft
2
3
4
5

loud enough for solo

"

"

nearly

very little change in
val further on

But the blubber on
base notes very bad
note note like orange but
most all same

823-c

flute

1 ft
2
3

not quite loud enough for solo
60%
50%

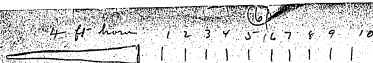
823-d

flute

1 ft
2
3
4

loud enough for solo
not quite loud enough
75
70

8



Record tests of above horn of violin, Flute
Cello + Harp, separately, at different distances at
N. Y. Studios ^{added room} comparing both studios
with the same horn.

#823

823 A ✓
Violin

823-B ✓
Harp

823-C ✓
Flute

823 D ✓
Cello

9

Experiment Prof. N.Y. Studio

Empty room

Prof. A
Berlin

Rather
Barrel-
Room seconds
Bred

Prof. B
Harb-

Something wrong
interference
the not clear

Prof. C
Plate

Is this mean down in a
well — outside of this
rounds. There is 2 quacks
or other bad things

Prof. G
Lello

This is better

1 ft. — about right for 50%
2 — drops had 65%
3 — 50%

Don't sound right

4 ft horn

⑤

1 2 3 4 5 6 7 8 9 10

Dec 68

Record tests of Violin, Flute, Cello Harp, with above horn
each instrument separately at different distances in
an empty room in N. Y. studio

824 ✓

824 A

Violin

824-B

Harp

824 C

Flute

824 D

Cello

Experiment 835 N.Y. Studio



Same depth
as 826, but
recorded in

835-A

vibr.

1 ft

Too weak for solo
thin —

Drop quick

835-B

Harp

1 ft —

Strong enough
but sounding coarse
with timbre above
bar —

~~Drop~~

Quality of
none of instruments
very good —

835-C

flute

1 ft

2

not strong enough
60%

}

835-D

cello

1 ft

2

not quite strong enough for solo
80%

}

Horn used for
Van. Room



1 2 3 4 5 6 7 8 9 10

Dec. #68

Record tests of Violin, flute, Cello, Harp in x horn
each separately at N. Y. Studios

Ex 825

825-A

Violin

825-B

Harp

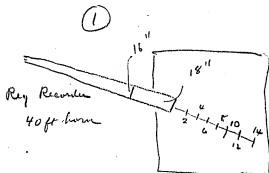
825-C

flute

825-D

Cello

13



14

#1
2 ft. about same loudness as Reg. Phone
4 ft. - loud enough 75% of
2 ft. - better quality
6 ft. 50% of volume as #2 ft.
8 - 40%
10 - 38%
12 - 37%

N^o 1 =

2 ft about same hardness as Reg phos

4 ft - Loosened Enough - 75% of

2 ft - better quality -

6 - 50% of Volume as # 2 ft

8 40%

10 38%

12 37%

} quality good
Base good



① ✓

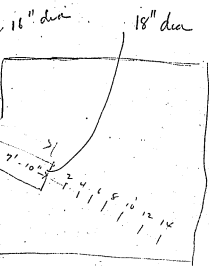
K

40 ft

Reg Recorder

40 ft Hmn

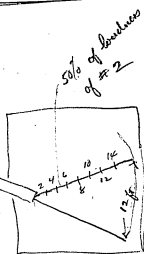
Page 13



15

(1 A)

Ray Recorder
40 ft horn



16

(1 A)

2 ft away 50% of 2 ft. on No 1

4 - Weak

6 Very Weak

8 can just hear

1. A -

2 ft, only 50% of 2ft out to 1

4 weak -

6 Very weak

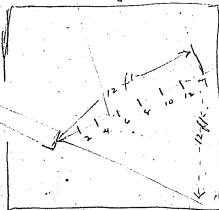
8 Canyon head -

(1. A) ✓

Reg Recorder
40 ft Horn
wide angle

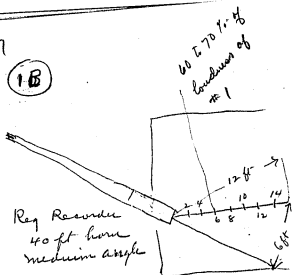
Page 15-

50% of location
of No 1



17

(1B)



18

(1B)

2 ft about 65 to 70% of 1A

Rest in proportion louder
than 1A
Not near as loud as #1

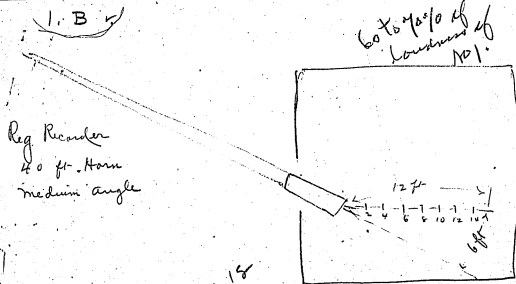
1 B -

2 ft about 65 to 70% of

1 A - Rest in preparation

~~1~~ Slender than 1 A not
near as loud as

501

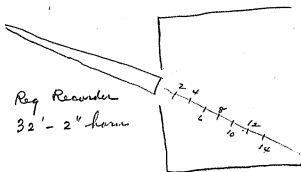


Page 15

19

1 C.

Reg Recorder
32' - 2" horn



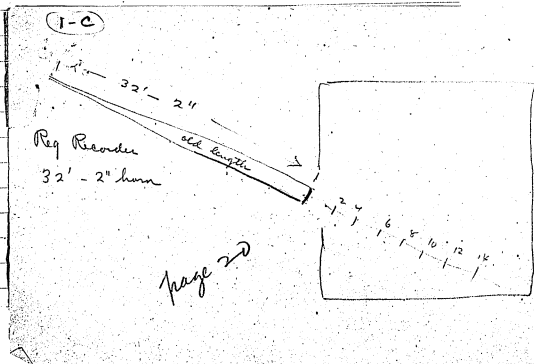
20

1. C.

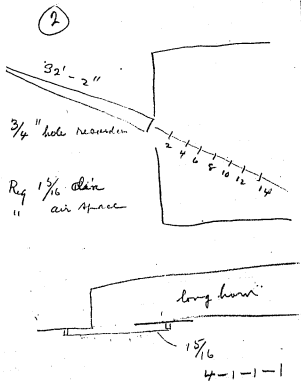
This is not as loud or good
as #1, but should say
85% of #1 - quality -
don't seem so good

1 C =

This is not as loud
or good as ~~#~~ #1 -
anywhere but should
say 85% of #1 - quality
don't seem so good



21



22

(2)

This is much louder than any
so far

But diaphragm is not held up and
controlled by air space enough
and quality is like a cylinder
phone with a very short funnel,
sharp timbre, at 8 ft it is
surprisingly loud

There is too much opening here
to keep this opening to get loudness
you must have either a smaller
chamber, so air will control
diaphragm better, or increase
diameter of diaphragm to get
more air cushioning

This is a good line of experiment
as loudness is satisfactory
only want quality

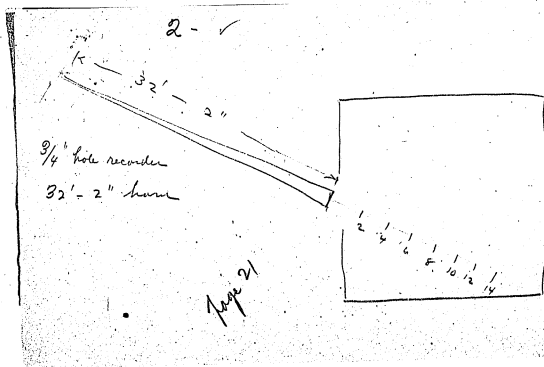
No 2

This is much louder
than any so far, ~~but~~
But diaphragm is not held up &
controlled by air space enough
& quality is like a Cybex
phone with a very short
funnel - sharp timbre
at 8 ft. its superhumanly loud

There is too much opening -
hence to keep this opening to
get loudness you must
have either a smaller chamber
so air will control diaphragm better
or increase diameter of diaphragm
to get more air cushioning over

This is a good line of
experiments as loudness
is satisfactory, only wants
quietly -

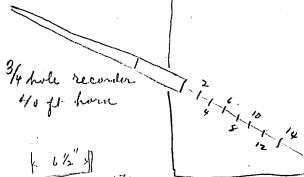
3



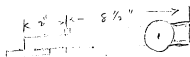
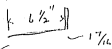
23

Same as #2 page 21,
ex. Capt. Horn is longer

2A



$\frac{3}{4}$ inch recorder
4/8 ft horn



24

(2A)

About same loudness as #2

Quality a little better

think this is 80% of loudness
of No 2

This would indicate that
lengthening the horn did not
increase the loudness

N02A-

about same
~~loud~~ loud as N02

quality a little better

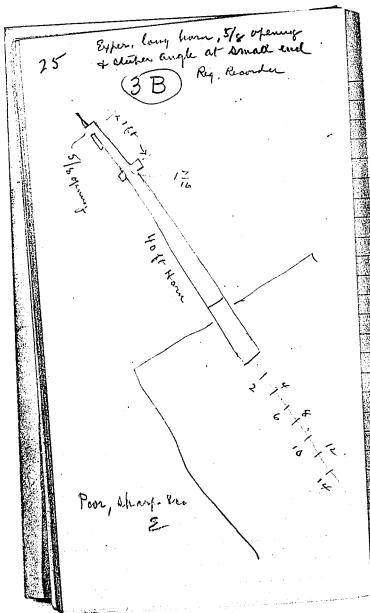
think this is 80% of
loudness of N02

2-A,

$\frac{3}{4}$ " hole Recardin

40 ft horn

page 23



26

3B.

Very poor quality shark, bad
land at 4 & hear good
at 12

3-B Very poor quality
sharper & loud

Page 24
loud at 4 & near dead
at 12

page 240

4-B Quality mellow

+ very much better

wants a little more

control by the chamber

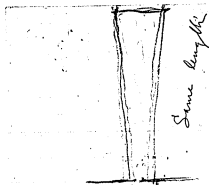
an in chamber wants to cashing

control more - next

change should be to 3/8

opening & chamber (opened)
a little -

9 to 10
11 to 12
13 to 14
15 to 16
17 to 18
19 to 20
21 to 22
23 to 24
25 to 26
27 to 28
29 to 30
31 to 32
33 to 34
35 to 36
37 to 38
39 to 40
41 to 42
43 to 44
45 to 46
47 to 48
49 to 50
51 to 52
53 to 54
55 to 56
57 to 58
59 to 60
61 to 62
63 to 64
65 to 66
67 to 68
69 to 70
71 to 72
73 to 74
75 to 76
77 to 78
79 to 80
81 to 82
83 to 84
85 to 86
87 to 88
89 to 90
91 to 92
93 to 94
95 to 96
97 to 98
99 to 100



3 1/2 ✓

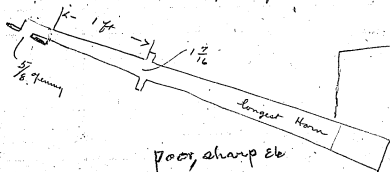
5 1/2 ✓

1/2 ✓

3/4

1/4

Experiment long horn with 5/8 opening
+ steeper angle at small end



3-B.

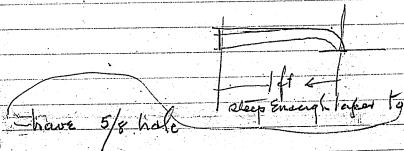
page 26

2 4 8 12
6 10 14

DEC 3 1919

Walter

With your $\frac{3}{4}$ " opening there is too little cushioning of air not enough to make diaphragm hold - I think you should make the taper sleeper for last foot so you



or another one with $\frac{1}{2}$ " hole -
Requiring $\frac{3}{8}$ "

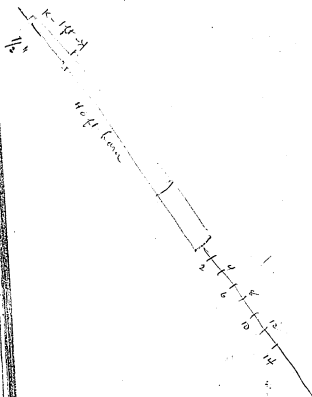
As the waves are almost straight when they reach last foot you can make this foot a sleeper taper without much loss & hence get a better cushioning

See

27

Exfer, long horn, $\frac{1}{2}$ " opening
+ steeper angle at small end
by recorder

4 B.



28

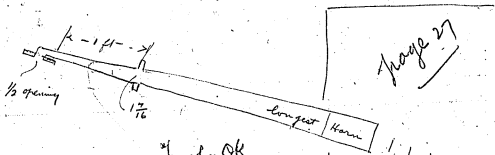
(4 B.)

Fairly OK but, another with
exfer is comes to $\frac{3}{8}$ opening
make another + run down to
 $\frac{3}{8}$

Quality mellow + very much
better, wants a little more control
by the chamber, air chamber
want to cushion + control more.
next change should be to $\frac{3}{8}$ "
opening + chamber lessen a
little.

Get same loudness as 3 B.

Experiment long horn with $\frac{1}{2}$ " opening
+ steeper angle at small end.



* fairly OK

cut another
with taper as comes
to $\frac{3}{8}$ opening, necessary

Make another
taper + run down to
opening $\frac{3}{8}$

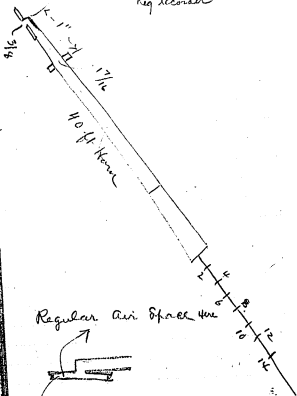
4-B.

✓ 29 Upper, long horn, $\frac{7}{8}$ " opening
+ slipper later at small end

5B

Diaphragm 1 $\frac{5}{16}$

Reg recorder



Regular air space 4in



about $\frac{4}{1000}$

5B

30

Shade louder at 6 ft

Not much difference in quality
(compared with Reg Recorder)

Standard Recorder - 40 ft Horn

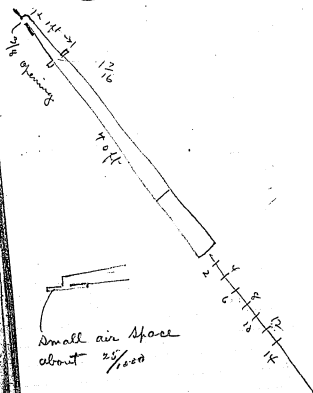
4 ft ok for control band quickly not
as good as it should be +
6 ft ok for control band not so good

1

Page 29

Shall lower vel at 6 ft not much
difference in quantity -

✓
31 Ex per, long horn, $\frac{3}{8}$ opening
steeper angle, small air space
6B Hessman 15/16



6B

32

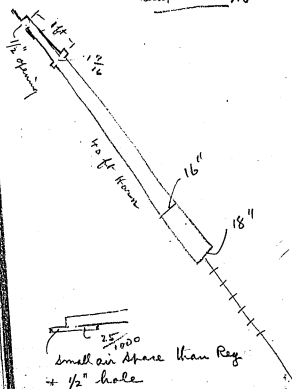
Not as loud - Considerably
less loud at 6 ft -
Quality better all three

(Compare with Reg Recorder &
Page 29

Page 31

Not as low - considerably less found
at 6 ft — Quality better all
than

- ✓ 33) 8 ft horn, $\frac{1}{2}$ opening
steeper angle at small end
and small air space
7B. Quadrant $1\frac{5}{16}$



Seem louder than $\frac{3}{4}$ opening
Quality about same

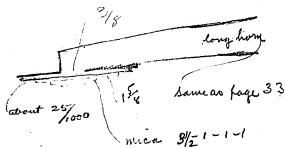
7B.

Louder than regular all thru
+ quality a little better
should say that at 6 ft.
it would be ok loudness
for most instruments
weaker ones could come
nearer + louder ones
further away

Page 33

louder than Reg all them &
probably a little better should say
that at 6 ft it would be OK
loudness for most reasonably
worker ones could come
nearer a Louder one
further away.

35/ 8 $\frac{1}{2}$ in, long horn $\frac{3}{8}$ opening
 steeper angle at small end
 and small air space
 8B and $1\frac{5}{8}$ diaphragm



Results
 See page 111

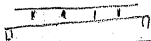
36

8B

Volume 25% of Reg. but -
 Quality very great improvement,
 its more muffled & has a
 peculiar reinforced note
 which comes at times,
 but quality is greatly improved,
 should say 100% improvement
 some thing is in line with
 one note.

Different thickness of wire
same length

Book says 4 post thin wire



F. 135

Book say short wire
is sharp + less mellow

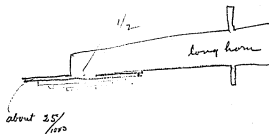
Real short wire

Page 35

Volume 95% of Reg but
quality very great improvement
its more muffled & has a peculiar
reinforced note which comes
at times but quality is
greatly improved & would
say 100% improvement.
Something is in tune with
one note.

37

9.B. Same as 8B. except -
opening which is - $\frac{1}{2}$ "



38

9B

105% loudness of Regular
The quality is not up to
page 35, but it far better
than regular in fact no
comparison

It amplifies one note (base)
but not so strong as 35

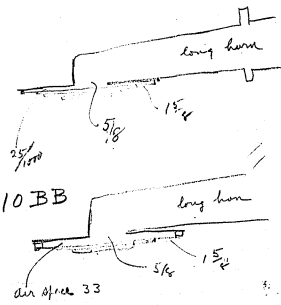
Page 37

105% loudness of Reg-
The quality is not up to 35
but its far better than Regular
in fact no comparison

It amplifies 1 note (6 and)
but not so strong as 35

✓
39.

10B Same as 8B + 9B
except gummy which is $5\frac{1}{8}$ "



This is louder + fuller than Reg

10BBB

Same as - 10BB but gasket on
end - for bigger air space
Results - loud as 10BB but fuller

48

10B

Little louder than Reg
sharper than 37, quality
not so mellow
Reinforces that same note

Page 39

little louder than frog

Sharper than 37.

Quality not so mellow

Ramfones ~~that same~~
note,

41

Conclusions with notations

1% Absorption 100% = perfect

Opening	Experiment	Sound	Time
3/8"	8B ✓ page 35	73	81 2
1/2"	9B ✓ page 37	76	79 15
5/8"	10B ✓ page 39	78	81 2
Reg. 5/16"	no wire	80	80
3/4"	11B - page 43	76	83 3
3/4"	12B - page 45	80	82 5
5/8"	16 BB page 39	86	80 1
5/8"	10 BB page 39	82	85

same machinery

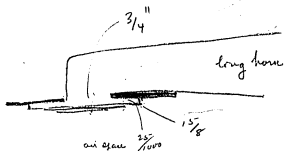
see model

8 days page 45 best
 " 37 } next
 " 39 }

42

✓
43

11.B- Same as 8.B
except opening which is $\frac{3}{4}$



44

11.B

90% loudness of Reg

Quality not as good as ^{page} 35-

but better than Reg
don't hear the reinforced note.

Page 43

90% of Condens of Reg

Quality not as good as

35. but better than Reg

dont hear the reinforced nite

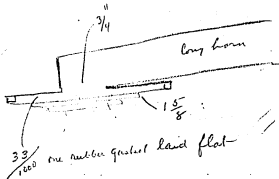
45

Jan. 10, 19

12B

Found that 11B - $\frac{3}{4}$ " opening
was very good quality

Try larger air space to get
at low end



not quite as loud as
no $\frac{5}{8}$ " opening with same
air space
Quality about same.

see page 41

tried this again +
found $\frac{3}{4}$ " opening a
shade louder than
 $\frac{5}{8}$ "

46

12B

Loudest yet 115 to 120"
Quality better than Reg

not so good as page 35, but
if muffle a little would
probably equal it

Has no reinforcement of that
base note

Page 45

Lowest yet 115 to 120%

Qualitatively better than Reg -

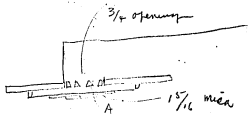
not so good as 35, but
if muffled a little would
probably equal it

Has no reinforcement of
that base Note.

46

13B

Same as Regular except -
the perforated plug A.

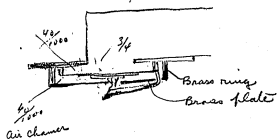


This was very much
weaker than regular

N. G

47

48



Tried air chamber below
diaphragm as above

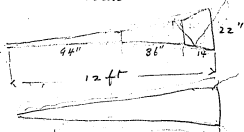
Results - was much weaker
+ muffled + lacked definition
when compare with out-
lower air chamber

49

50

Horn Comparisons, Reg. Recorder

compared long 40 ft horn
with



Short horn is loudest
+ fullest

seem to be a slight difference
in quality, long horn sounds
more distant

tried comparison at 4 ft. +
6 ft away - short was
loudest in both cases

1 st trial	12 ft	4 ft away
2 nd "	40 ft	4 ft away
3 rd "	12 ft	6 ft "
4 th "	40 ft	6 ft "

made this again, notations are reversed
in 2nd trial.

51

1st 12 ft Horn - 4 ft-

2nd 40 ft Horn - 4 ft-

little louder than 1, but correct
quality

3rd Short - 12 ft - Horn 6 ft- X

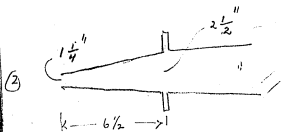
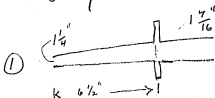
Louder than 4, but quality
correct of any heard

4th 40 ft Horn - 6 ft-

Quality correct not as good

52

Long horn, different end

Both use with $\frac{3}{8}''$ opening diaphragm

#2 was a little louder than
 #1, but very poor sharp tone

54

5" Recorder

$$1^{st} (5^{th} - A)$$


Fresh: diaphanous $7-2\frac{1}{2}-2\frac{1}{2}-2\frac{1}{2}$


$$+ 12 - 3 - 3 - 3 + 16 - 3 - 3 - 3$$

the last one was bent & was used
in following experiment—

5th - A was very weak
thinner displacement was noticed

*2 (5" B) is about 1/1000 air space instead of $\frac{32}{1000}$ very much weaker than #1

#3 (5" G) same as #1 but $\frac{57}{1000}$ in
space - lower than #1 but too thick

#4 (5"-D) same as #3 but. short
arm 
no lower

55

2. Hardly hear these

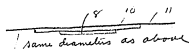
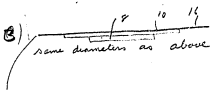
Page 54 —

Hardly hear them

56

 $3\frac{13}{16}$ - RecorderEx ($3\frac{13}{16}$ A)

Fouder than 5" - but too weak

Ex ($3\frac{13}{16}$ B)Ex ($3\frac{13}{16}$ C)

did not try these two as
the variation of diameters
on page 54 showed so little
change

57

60

 $1\frac{7}{8}$ - diaphragmEx ($1\frac{7}{8}$ A) $\frac{5}{8}$ - opening

B



C



Kasullo A was very weak

B shade louder

C - was loud + fuller than A or B

C. was fuller than regular, +
or shade weaker

Compared with 10 B B page 39

C is weaker + fuller

This shows that with $\frac{5}{8}$
opening - $1\frac{7}{8}$ than is better
than - $1\frac{7}{8}$

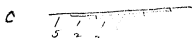
61

Loudness Commercial Advertiser
judge between 4 + 5 ft.
say 5 ft.

Correct nearly natural but
still same wave

62

$1 \frac{3}{4}$ diaphragm
(Ex $1 \frac{3}{4}$) $\frac{5}{8}$ opening



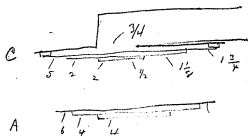
C is louder & clearer than A
C is louder than - page 60-C

C compared with 10 B.B. page 39
shade weaker than page 39
but very little
? as to which is best I
prefer $1 \frac{5}{8}$

63

only commenced load at 4 ft-
6 much too weak
variations of volume on sustained
notes of cornet much less &
quality of cornet very much
more natural.

63

 $\frac{3}{4}$ opening
 $1\frac{3}{4}$ diaphragm


A



A - much weaker than C.

C is weaker + fuller than ^{12B} page 45
 which is $1\frac{5}{8}$ diaphragm + $\frac{3}{4}$ opening

D



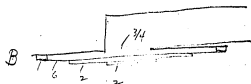
D is louder than A, B & C
 shade weaker but fuller than $1\frac{5}{8}$ diaphragm
 $\frac{3}{4}$ opening Page 45 -

64

Not as loud as page 7.
 Volume at 6 ft. too weak for
 commercial work.
 Irregularity on surclench and
 rolls very great, on that is
 much so that cannot sound
 entirely unnatural

65

$\frac{3}{4}$ opening
 $1\frac{7}{8}$ diaphragm



C



B is much weaker than C
 C is ~~much~~ + fuller than $1\frac{3}{4}$ diaphragm
 about same hardness as $1\frac{3}{4}$ C page 63

66

Commercial OK at 6 ft.
 but corner some what
 unnatural + wavy.

67

Feb 7th 1920
 Conclusions to date

$1\frac{5}{8}$ dianthum best diameter

$\frac{25}{1000}$ air space - N. g

find greatest ($\frac{33}{1000}$) air space is always better
 than $\frac{25}{1000}$ " space

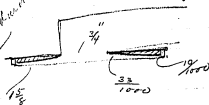
between $5\frac{1}{8}$ + $3\frac{1}{4}$ openings
 after several trials $\frac{3}{4}$ is lowest

68

69

Air Space Experiment

Standard



the wire inserted in air space
with gas-tight on edge

Result this is louder & fuller
than page 45 - 12 B. which is
without above plate

70

20% louder (than page 45) 6 ft away
loud enough for commercial
Quality Power

Page 45 sustained note on
cornet study

~~~~~ Volume

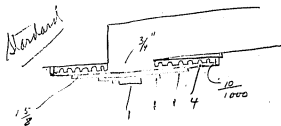
on 69 ~~~~~ Volume

This phenomena occurs in lots  
of our records & I cannot understand  
how it is possible to vary the volume  
on a constant-volume sustained note

If recording machine varies in each  
revolution, but always went 80  
per min when times they would do it

Means that if this volume variation  
was regular at 80 rev it might  
be the machine, run on occasion

91

Air Space  $\frac{3}{4}$  opening  
 $1\frac{1}{2}$  dia

this inserted in air space  
with gasket on edge

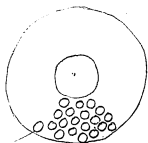
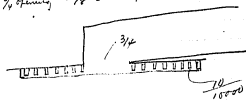
Recalls about same as  
page 69 might be a little  
fuller

92

Soundness same as 69  
loudness at 6 ft loud enough  
for Commercial work  
Quality a shade better  
I think cannot sustained note  
still wavy

73

## Air Space

 $\frac{3}{8}$  opening 15% built up mass

disc inserted in air space  
full of  $\frac{1}{8}$ " holes to act as dash pots

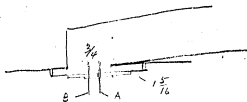
Results weaker than page 69 or 71

~~74~~

not quite as loaded as 69  
as 71, not loaded enough for  
commercial, slightly weak  
good as 71, but small deflection

75

## Off Center

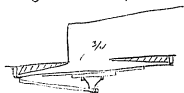


try mounting diaphragm  $\frac{1}{2}$  off  
 Center with foot of arm at B  
 also with foot of arm at A  
 when compared with regular  
~~as~~ mounting, ~~it~~ neither A or B  
 showed any improvement,

76

77

## Arm Experiment

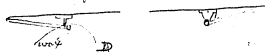


A

above same combination as page 69  
except arm with is tube type

B

as above but arm cut and  
used as follows



C. filed to a delicate joint @ D.

78

A



B-

is louder than A

but both curves are wrong

79

Conclusion to here

Page 45 -  $1\frac{1}{8}$  dia  $\frac{3}{4}$  opening  
louder than Reg.

Page 69 same as above but  
air space ~~is~~ ~~is~~ ~~is~~  
this is 20% louder than 45

Page 71 same as 45 but air  
space ~~is~~ ~~is~~ ~~is~~ same  
loudness as 69. Quality better

Page 77

Say new arm is louder. I

Page 50

Say 12 ft horn is louder  
+ better quality

80

Compared Regular Recorder  
with improvement  
to date which is

Reg Recorder

Page 69

1st trial - Reg Recorder

2nd trial -  $1\frac{1}{8}$  dia page 69

2nd is loudest. Say 20%

## Horns

Same comparison as Page 50  
but in following Rotation

|                      |            |           |
|----------------------|------------|-----------|
| 1 <sup>st</sup> horn | 40 ft horn | 2 ft away |
| 2 <sup>nd</sup> "    | 12 ft "    | 2 ft "    |

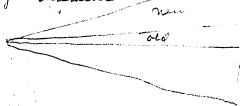
|                 |            |           |
|-----------------|------------|-----------|
| 3 <sup>rd</sup> | 40 ft horn | 6 ft away |
| 4 <sup>th</sup> | 12 ft horn | 6 ft "    |

1<sup>st</sup> slightly louder

4<sup>th</sup> slightly louder

Mr. Edwin

very little diff. between  
these horns, suggests that  
soft horn, could have a  
steeper angle & make mouth  
larger diameter



83 2?

N. Y. Comparison  
of (page 69)  $\frac{1}{8}$  + Reg  
With Raffield Horn  
+ Geo Ballard

1st trial  
Reg dia (wire) 6" away

2nd Reg dia 6" away  
| These muffled not as loud  
as #1

3- Reg Dia 16" away  
| Sounds weaker than #2

3 to show 2

84

85

## Comparison of Reg +

Reg Dick (fig 69) with 40 ft horn  
with Geo Ballard

1<sup>st</sup> Trial - (Reg Dick) <sup>wire</sup> 10" away

2<sup>nd</sup> Reg Dick (wire) - 10" away

2<sup>nd</sup> Best - cleared - #1  
has horn sounds though at  
loudness about same

(duplicate  
see page 87. + 89)

86

87 <sup>v</sup> New Ballard in Person  
Py. dia (wire) & 40 ft Horn

1 - 6" away

2 - 10" away

3 - 14" "

4 - 18" away

Better than #4 page 89  
thinner quality loudness  
if anything a shade weaker

(S)

note  
see top 89

E. says

88

1<sup>st</sup> loud - 70° can hear but still muffled  
muffled not clear lot of repetition

2<sup>nd</sup> loud 67° - clearer & more enjoyable  
hear some words still muffled some

3 loud 65° - clearer not so muffled hear  
3/4 of the words more pleasing

4 loud 63° - clear - ok not muffled  
natural

Page 87-

(3)

Ray Her

1st ~~70%~~ 70% Cant hear but little noise -  
6" Muffled & not clear. Lots of  
reflections.

2nd 67% Clearer & more enjoyable  
10" hear some words - still  
muffled some

3rd 65% Clearer not so muffled  
14" hear 3/4 of the words  
more pleasing

4th 63% Clear - ok not muffled -  
18" natural.

89 <sup>3</sup> Gen Ballard in person  
Buy him (Page 69)  
+ 4 off Horn

1st - 6" away

2 - 10 - away

3 - 14 away

4 18 away

(2) for comparison of vocal  
on 1 3/8 + 1 1/2 recorder

90

E. says

1st loud - 70 not so muffled greatly  
Hear 1/2 the words quality fair

2nd loud 72 - little better than #1 in  
quality loud + less muffled

3 loud 67° not as good as #2

4 " 66° " as good as #2

(3 1/2)

Page 89-

New Wes

1st - 70% - not so muffled greatly -  
6" hear 1/2 the words - quality fair

2nd 72% little better than 1st in  
10" quality, loud - less  
muffling -


3rd 67% - not as good as 2  
14"

4th 66% - not as good as 2  
16"

91  $\checkmark$ 

Ballard Record + Phone

6" away

A  Loud True  
10 ft horn 70 70

sounds distant

B.  70. 70  
12 ft horn

Same as A

C.  75- 60  
Hoffert's Horn

Not so distant-  
+ louder + sharper



To show what is  
better on short horns

92

I say

A loud - 70 only fair

B " 68 quality good

C " 75 quality not so good  
as B.

Page 91-

(4)

A. 70% only fair

B. 68-

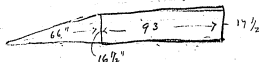
quality good

C. 75 -

quality not so good  
as B

93  $\frac{1}{2}$  Ballard record

Horn #3



Compare above Horn with 40 ft horn  
with Ballard record - 4 ft away

1. Recorder #60 + Horn #3

2.  $1\frac{3}{8} + \frac{3}{4}$  recorder page 69 + Horn #3

X

3. Recorder #60 - 40 ft Horn

4.

4.  $1\frac{3}{8} + \frac{3}{4}$  recorder page 69 + 40 ft Horn

(Σ) for above

Phon meter 2 loudest 40  
4 next - 38-40  
3 next - 35-  
1. weakest - 30-

94

Compare 1 + 3 for horns, 1 was  
loudest + not so muffled as trial 3

Compared 1 + 2 for recorders. #1 was  
shade louder + clearer

Compared for horns #2 + 4 - two as loudest  
+ not so distant -

2. Days

1. 1st loud 70 quality not very good  
music faint, OK for Com'l Volume

2. 2nd 85 quality much better hear  
words OK + some of music, louder  
than Com'l necessary

3. 3rd 68° quality fair not so good  
as #2

4. 4th loud 68 not so good as #3  
would say it bad  
2 is best + loudest

Page 93

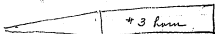
1st 70% - quality <sup>ok for Council Valer</sup> not very good More faint

2nd 85% quality much better near words  
ok & some of words - louder  
than Council necessary.

3rd 68% - quality fair, not quite so good  
as 2 -

4th 68% - not so good as 3 -  
would say to 68% -  
2 is best & loudest

95 4/ Band Records  
same tests as page 93



Horn + recorder Comparisons

Goals

1- Reg.  
Recorder # 60. Horn # 3

2 - 1 1/2 + 3/4 page 69 Recorder Horn # 3  
X

3, Reg-Recorder # 60 - 40 ft Horn

4 - 1 1/2 + 3/4 recorder + 40 ft horn

Rhino meter 2 loudest

3 next

1+4 same + weakest

96

Compared 1 + 3 for horns with Band  
loudness about the same, 3 has no high  
sounds, at all bottom, if any difference in  
loudness #1 is.

Compare 1 + 2 for recorders  
loudness about same, #2 is bottom heavy.

Compared 2 + 4 for horns. 2 is louder +  
not so distant

Shows that each results are for volume ~~and~~ different  
from vocal see page 93

E. Days

1- loud 70 Cornet loud enough pretty  
fair quality

2 loud 85 but Melody waves (Cornet)  
quality poor, loudness brings out  
defects

3 loud 68. Waves a little more so conspicuous,  
quality, whops a shade more pleasing  
than #1.

4- loud 70. Waves a little but more than 3  
quality fair about same as #1, There is  
a resonance some where in this on  
Cornet

Page 95

1/2 in

①

1<sup>st</sup> 70% - Cornet loud enough - pretty fair quality

New Horn

Reg

2<sup>nd</sup> 85% but melody ~~Waters~~ (Cornet) pretty good  
loudness & range and effects

New Horn  
Now

3<sup>rd</sup> 68% - waves a little not so conspicuous  
quality perhaps shade more  
pleasing than No 1 -

Hoff horn

4<sup>th</sup> 70% waves a little but more than  
3 - quality fair about  
same as 1 - There is  
a resonance some where in  
this on Cornet,

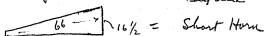
Hoff

97

See page 99

High &amp; Low Whistle

Big area



Whistle 1 ft away -

1<sup>st</sup> High Whistle Short Horn2<sup>nd</sup> High Whistle 40 ft Horn3<sup>rd</sup> Low Whistle Short Horn

see page 99

4<sup>th</sup> Low Whistle Long HornWith high whistle short horn  
is much louderWith low whistle loudness  
about the same, in long horn  
the tone is softer whistle muffled.Will not show this  
as page 99 is same thing  
& horns opening are same diameter

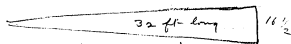
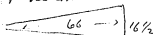
98

99 1/2

Comparison of

High & Low Whistle

With Ray 17 1/2 recorder  
& horns below, Whistles 12" away



1st High whistle 32 ft horn  
- 0 - Phono Meter

2nd High whistle 66" horn  
louder than #1 Phono meter - 0

3rd Low whistle 32 ft horn  
louder than 4 - Phono Meter 55

4th Low whistle 66" horn  
Results Phono meter 90  
in short horn High whistle  
is louder, in long horn  
low whistle is louder

2

100

E. rays

Can not hear the high  
whistle, try & get a louder  
whistle

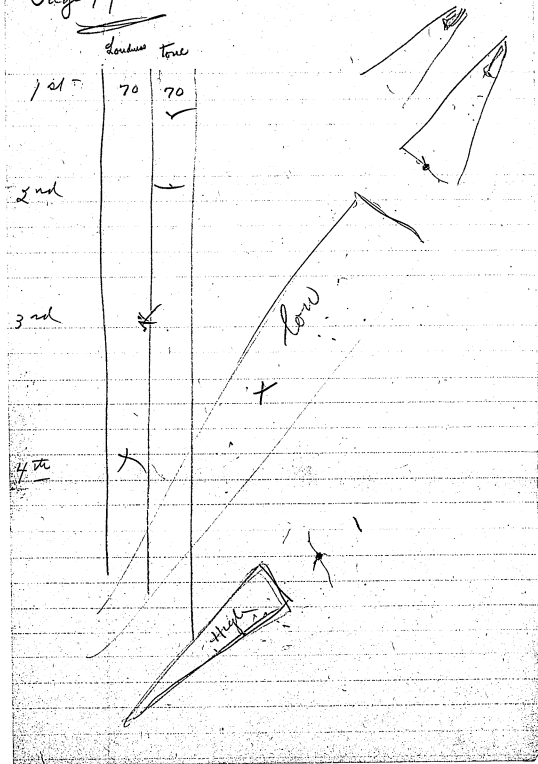
Phono meter will not register high  
whistle

By ear the low whistle is  
loudest with horn #3 long horn

With Phono meter it is reversed  
short horn is loudest,

Page 99

(5)



101

ΣPointed Arm Recorder  $1\frac{1}{2}$ 

Band Record - 4 ft away

 $1\frac{1}{2}$  -  $\frac{3}{4}$  away


1st trial

Best  $1\frac{1}{2}$  Recorder to date page 71

2nd trial, everything the same  
except arm which has pointed  
foot & no ticks

This is louder & fuller  
than #1

③

try above   
 $\frac{1}{8}$  to be .001 instead of .004

This is much louder than  
2nd trial above 4-1-1-1. + most  
anything to date, cut is rougher  
but think it feasible

See page 117

102

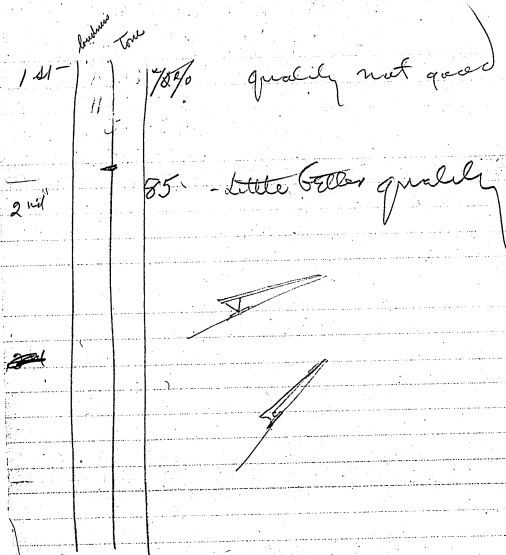
Σ say

1 loud - 70 quality not good

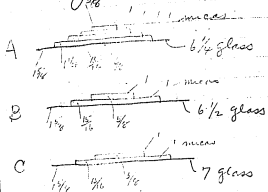
2nd " 85 little better quality

Page 101

(6)



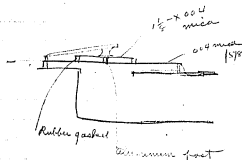
103

Glass Diagram  $1\frac{5}{8}$ 

|          | Lead | Time |
|----------|------|------|
| A        | 68   | 70   |
| B        | 68   | 68   |
| C        | 65   | 65   |
| Standard | 70   | 70   |

Glass are too thick will  
try + get 4 or 5 thousand  
thickness

104



Much weaker than standard  
has seem much weaker although  
it is not this time

105

21

## Comparison of Pans →

On 1 3/4 Rec. + Reg. Rec #64  
with #3 horn page 93

1st Reg #64 Rec. Long Pans horns  
2" away - Reg way taking Pans

Best? See #3

2nd Standard 1 3/4 Rec page 71  
with #3 horn page 93 - 4 ft away

Fuller than #1 - more uneven  
middle of Pans - notes <sup>more</sup> explosive than #1

3. 1 3/4 Rec - 3/4 Henry - mica 1-1-1-1  
pointed arm - #3 horn 4 ft away  
see page 101 - (3)

This is louder + fuller than any  
of above + as even as #2

Question between this + #3  
will try further

106

Object of comparison to compare results of New  
apparatus to date, with Regular methods  
of recording

Results so far seem to show that nothing  
is gained by ~~direct~~ working a distance from  
horn, when you get horn + recorder  
sensitive enough they seem to respond  
to any farther note which make uneven  
records

Er says

- |     |         |                          |
|-----|---------|--------------------------|
| 1 - | loud 70 | fine quality             |
| 2   | " 68    | quality no so good       |
| 3   | " 70    | quality not as good as 1 |

(7)

Page 105

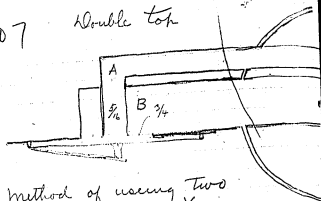
|  | 1st | 2nd | 3rd |                  |
|--|-----|-----|-----|------------------|
|  | 1st |     | 1st | 40% fine quality |

|     |  |  |  |                         |
|-----|--|--|--|-------------------------|
| 2nd |  |  |  | 68- quality not so good |
|-----|--|--|--|-------------------------|

|     |  |  |  |                                |
|-----|--|--|--|--------------------------------|
| 3rd |  |  |  | 78- quality not so good<br>101 |
|-----|--|--|--|--------------------------------|

107

Double top

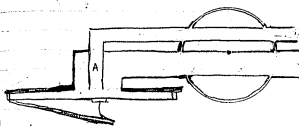


Method of using two  
horns without a Y  
to see if it is louder

Extrance A is very much  
weaker than B  
tried bringing A close to diaphragm  
to get at louder results was  
weaker  
tried different distances as far as  
 $\frac{1}{8}$ " -  $\frac{1}{16}$  is as good as any.

Played Phono 4 ft away into  
2 horns connected with above  
top + compared with  
Regular recorder under same  
conditions with Y + same style  
horn - The Y outfit was  
much louder.

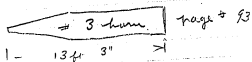
108



See Page 131

109 (c)

## Horn Comparisons



Soundness about the same  
 # 2 horn is considerable fuller

Seems to show that if you  
 wanted to get a thinner horn  
 you can do so by using steep  
 angles at the small end

No sample

110

III

C/

### Harp trials

Comparison of N.Y. & Col. Studies

1<sup>st</sup> - N.Y. - with 16 R.H. horn  
6" away, horn following the flange

2<sup>nd</sup> Col. Studies # 3 horn Page 93

Rec - Page 71

Harp 20" away

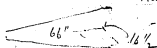


N.Y. is louder & less muffled  
Did not show - 2

113 G

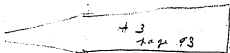
Harp trials + Horn Comparison  
 Recorder page 71  
 Harp 20" away

1st



1st section of #3 horn page 93

2nd



#1 best shade louder & less  
 muffled

114

E. Harp

1 - Best loudest

2nd not so sweet, sharper

Page 113.

8 ②

|     | Loudness | Time |                         |
|-----|----------|------|-------------------------|
| 1st | 70       | 70   | 70% Best - Loudest      |
| 2nd | 65       |      | not so sweet<br>sharper |

2nd not so  
loud -

115

Harp trial - #3 horn page 93  
 (Recorder page 105 #3 - 198 - pointed arm  
 1-1-1-1)

1st trial 4 ft } as loud as N.Y. trial  
 2nd " 6 ft } fuller, bleat heard  
 3 " 8 ft } in middle of harp G.A.B.  
 } weaker than N.Y.

Cords rattle single wire OK.

Asphalite  
 See page 119 + 120

116

N.Y.

OK

?

117

from page 101

## Harp Recording

Same Recorder as ③ page 101  
 found the recorder rattled  
 on harp - tried diagram 3-1-1-1  
~~at 3-1-1-1~~, 2-1-1-1 was  
 best and louder than page 71  
 but it still rattle a little  
 tried 3-1-1-1 this is only shade  
 if any louder than Page 71

118

119

2

Harp Comparison  
with Sim Recorder page 117 - 2-1-1-1

# 3 horn

|                       |          |
|-----------------------|----------|
| 1 <sup>st</sup> trial | 20" away |
| 2 <sup>nd</sup> "     | 36 "     |
| 3 <sup>rd</sup> "     | 48 "     |
| 4 <sup>th</sup> "     | 60 "     |

2 says

- 100% too loud
- 80% Com'd
- 92% Poor Simul not detect
- 88 - not good

Σ 120

Same as opposite page  
except Horn

Horn  $\frac{11-66-11}{11-66-11}$

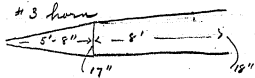
|                       |          |
|-----------------------|----------|
| 1 <sup>st</sup> trial | 20" away |
| 2 <sup>nd</sup> "     | 36       |
| 3 <sup>rd</sup> "     | 48       |
| 4 <sup>th</sup> "     | 60       |

These are more brilliant-  
and less muffle than page 119  
and just as loud

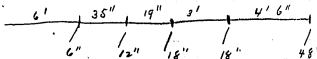
not heard by 2

121

# 3 horn



# 4 horn



Compared above with Stated Rec  
Page 71

at 2 ft with Phonograph  
# 4 horn was weaker & muffled  
at 8 ft, both were about same  
loudness but # 4 was very  
thick tone

E says

122

# 3 horn

- 1 two loud
- 2 Corn'd ok loud
- 3 little below Corn'd loud
- 4 weaker but not much

# 4 horn

- 1 not so loud as 3, much better quality
  - 2 loud Corn'd quality ok,
  - 3 Commercial
  - 4 shade lower than Corn'd
- all much better quality & dis-  
lose volume so much as you  
go away from funnel as # 3

Page 121

7/10/20

#3 Horn  
1 Too low -

2 Commercially OK horn

3 Little below Council load

4 Weaker but not much.

#4 Horn

1 - not so low as 3 but undoubtedly good

2 Good Commercial Good OK

3 Commercial

4 Shade lower than Council

all much better quality

& don't lose volume as  
much as you go away  
from funnel as No 3 does



7/10/21

Page ~~123~~ 123

- #1 Counsel (land)
- #2 ditto - about right
- } poor  
quality  
sharp  
muscle

Page 124

- 1
- 2
- 3
- } not very much diff in Val
- 3rd strongest
- all sharp -

125

#1 Standard Rec Page 71  
#3 horn#2 as above drawing  
#3 hornResults #2 is weaker & too full

E - says

- |            |                          |
|------------|--------------------------|
| 1 - Cornel | } very little difference |
| 2 - Cornel |                          |

try drawing using stick to indicate  
of draw, results was weaker & then time  
not shown to E.

126

Heaphraumb,

#1 Standard Rec Page 71

X. 1.179, mica

#2  4 glassResults #2 louder, fuller & better  
than StandardBrookland tried another, results  
New glass 4 - 1 - 1 - 1 much better  
Standard

Page 125

#1

Comed

#2

Comed

Very little diff

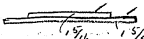
sharp

7/10/20

127

Diaphanous

1- standard Recorder Page 71

2-  all glass

Soundness about same  
#1 quality best

---

E says

128

Dome



4-1-1-1-1 med  
1 5/8

Compared above with Stand Page 71  
above was weaker, fuller + less  
definition,

---

E - says

129

Basket Ex.

4-1-1-1-1  
med

Compared with Standard Page 71  
it was just as loud & not  
so solid tone.

---

 2 says

130

Corks

Cork  
up

4-1-1-1-1

tried above with & without cork  
cork seems smooth  
loudness the same, tone may have  
been higher with cork?

---

 2. says

131

Double Recorder July 12, 20  
from Page 107



1. Made a test with Phone with Standard recorder & horns + Reg Y



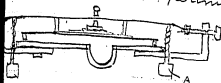
2. made same test with double recorder using the same diaphragm needle + gasket.

#2 was shade weaker wire about the same.

Conclusion that there is nothing gained by this recorder probably could be made to work as good as Reg Y, but if so, could not use the diaphragm, also. instrument playing to the center entrance would have to be closed + the entrance is the weakest.

132

Wire experiment



1. made test - Reg adjustment with 2 feet

2. as above, but screw A lower  $\frac{1}{2}$  turn to put pressure on dia phram, also loosen wire

3. same as 2 but wire tightened, about same tension as #1

| Results | load | time | } shows that edge fasts are weak pressure on diaphragm make record better and weaker |
|---------|------|------|--------------------------------------------------------------------------------------|
| 1       | 70   | 70   |                                                                                      |
| 2       | 71   | 72   |                                                                                      |
| 3       | 69   | 71   |                                                                                      |

- Try same experiment above, but with out fasts wire fast to arm

1. Reg tension wire fast to arm  
2. A unscrew  $\frac{1}{2}$  turn. + as above  
3. same as #2 - this wire tightened

| Results | load | time | } Results seem to be same as with fasts |
|---------|------|------|-----------------------------------------|
| 1       | 70   | 70   |                                         |
| 2       | 72   | 72   |                                         |
| 3       | 69   | 72   |                                         |

133

Diaphragms  $1\frac{5}{8}$

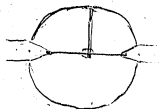
Compare with  $\frac{3}{4}$  opening Holder.

① 4-1-1-1-1 mica

② 4-1-1-1-1 "

#1 is best - loudest tone about 500

Short wire 1" long 134



above built same as standard but without feet  
Since 4-1-1-1-1 mica, same was louder  
than standard.

They tried with first  $\frac{1}{2}$ " apart  
result very much with Poole

135



### Comparisons

- 1 Standard page 71 - mea 4-1-1-1
- 2 4-1-1-1 mea, balance like Standard
- 3 glass reflector as above
 

|   |      |      |
|---|------|------|
| 1 | loud | wide |
|   | 70   | 70   |
| 2 | 80   | 80   |
| 3 | 90   | 90   |

This is loudest recorder to date  
 does not make any difference  
 on old  $\frac{5}{8}$  opening, but when  
 you have a big surface - like  
 $\frac{3}{4}$  opening results are different

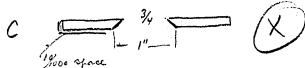
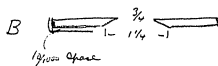
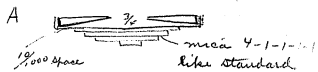
136

mea

OK

?

137



Compared the above air spaces

|   | low | low |
|---|-----|-----|
| A | 70  | 70  |
| B | 65  | 70  |
| C | 63  | 70  |

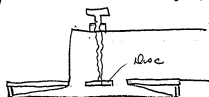
OWN

*[Handwritten signature]*

138

139

July 27, 20



|    |                                                                                 | loud | time |
|----|---------------------------------------------------------------------------------|------|------|
| A. | $\frac{3}{8}$ disc flush with Holder                                            | 70   | 70   |
| B  | $\frac{3}{8}$ disc 6 turns closer about<br>$\frac{1}{1000}$ from diaphragm      | 72   | 72   |
| C  | no disc                                                                         | 72   | 75   |
| D  | $\frac{1}{4}$ in disc flush with Holder                                         | 70   | 70   |
| E  | $\frac{1}{4}$ disc 6 turns closer about<br>$\frac{1}{1000}$ away from diaphragm | 72   | 72   |
| F  | no disc                                                                         | 71   | 72   |

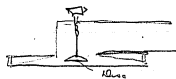
B is louder than E.

Trid  $\frac{3}{8}$  disc different distances  
from 1 to .005 as best (This is good)

See page 141

140

141



A  $\frac{3}{8}$  - .005 away      land      lowe  
70      70

B -  $\frac{1}{2}$  - .005 away      72      72

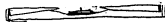
C -  $\frac{1}{2}$  - .014 away      71 - 72

$\frac{1}{2}$  at .005 away seems best  
but within say  $\frac{3}{8}$  is.

Compared loudest recorder to date

P Reflector page 135.      70      70

Reflector Recorder with  
 $\frac{3}{8}$  dia .005 away



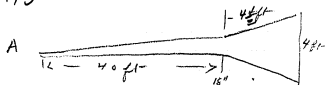
loudest to date

72 - 65

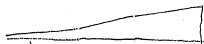
Standard Recorder      65 - 65

142

143



B



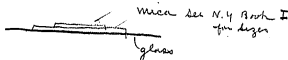
Horn #4 page 21 without glass

B is louder at 2 ft - same loudness as A at 8 ft

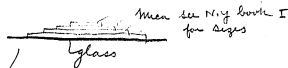
A is in all cases is muffled  
into brass with soprano,  
both blasted easily

144

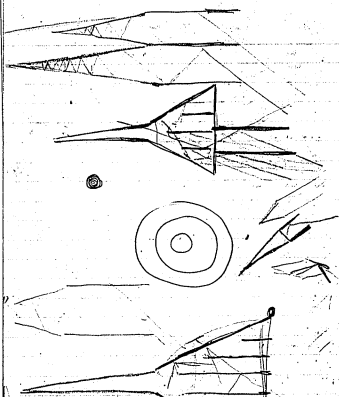
Glass Diaphragm 15/8



then tone - not good



louder + fuller than standard  
page 135 #3



|   | time | low |            |
|---|------|-----|------------|
| 1 | 70   | 70  | X          |
| 2 | 71   | 72  | expl. 100% |
| 3 | 68   | 68  | 50         |

| Standard | Receivers            | time | Roughness |
|----------|----------------------|------|-----------|
| 1        | low<br>4-1/2-1       | 70   | 70        |
| 2        | low<br>4-1/2-1       | 80   | 71        |
| 3        | low<br>4-1/2-1       | 75   | 68        |
| 4        | low<br>4-1/2-1       | 71   | 71        |
| 5        | reflector<br>4-1/2-1 | 90   | 90        |
| 5        | F                    |      |           |

[ITEM(S) FOUND IN BOOK]

Dec/ 20, 1919.

Mr. W. H. Miller Attached find Mr. Wilson's comments on the last records ( 23 - 34) made in the Columbia St. Studio. When you have finished with them kindly return so that we may file with the previous ones.

You will note that he desires to have the regular 2 1/2" opening tried (which he calls 2/8") and also another trial made with the 1/2" opening when the air chamber has been lessened.

Would suggest you have Frank make up the steep 12" and please for the regular opening, also a regular recorder form to which diaphragm can be transferred, then we can give him sample of 1/2" against regular using same diaphragm/ as we did with the 5/8" against the 1/2".

Kindly let me hear from you regarding the above so that I may tell Mr. E. it is under way.

Geo. J. Warner.

per F.C. Bart.

(2)

[ITEM(S) FOUND IN BOOK]

DEC 29 1919

Werner

Please diminish the chamber  
on the  $\frac{1}{2}$  opening more



chamber



chamber

& take another record

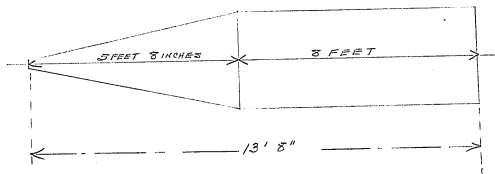
[ITEM(S) FOUND IN BOOK]

HORN NO. 13

14 1/2

18 INCH

18 INCH



JUL 3 - 1920

HORN NO. 4 12

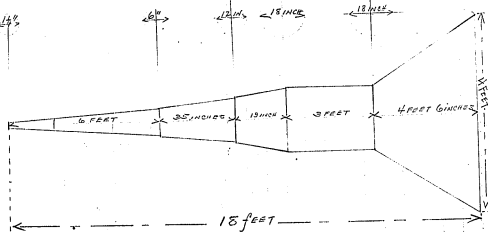
14 1/2

6"

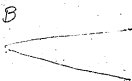
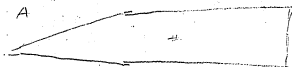
12 IN

18 INCH

18 INCH



[ITEM(S) FOUND IN BOOK]



1- A - 2 ft away  
B - 2 ft "

2 A - 4 away  
B - 4 away

3 A - 6  
B - 6

[ITEM(S) FOUND IN BOOK]

Trial # 13 Jan 27/21  
 Recorder #1. Luster Pair.  
 3 1/2 ft. ~~177~~ 9/16  
 with Prasad paper. 8-11-12-14-15

- 1st Trial ———— Hear Free  
 Can't hear tracking but its weak  
 Recording
- 2nd " just hear tracking with Univ  
 Record 50% Louder 20K
- 3rd. " 40% Louder with stay at end of Arm.  
 just hear tracking
- 4th " best tracking (weaker)  
 than 2nd " " blue's lightness  
 more,

Prasad



**Notebook Series -- Notebooks by Edison and Other Experimenters  
Group 4: Navy and Wartime Research Experiments (1917-1918)**

These three notebooks were used during the period February 1917-March 1918 for experimental work for the U.S. Navy and other wartime research performed at the behest of Edison. Other authors include E. Rowland Dawson, William Deans, William A. Hayes, Absalom M. Kennedy, and Henry G. Wolfe. Some of the entries relate to night visibility tests to help rangefinder users develop more sensitive night vision for spotting submarines. Other experiments pertain to the use of sound recording for submarine and torpedo detection. There are also notes on experiments with kite rudders for Navy ships. Related material can be found in the Naval Consulting Board and Related Wartime Research Papers, Special Collections Series.

N-Number

Labels and Inscriptions on Front Cover

**Selected Books**

|            |     |
|------------|-----|
| 17-02-06.1 | --- |
| 17-08-25.1 | --- |
| 18-02-21   | --- |

**Notebook Series -- Notebooks by Edison and Other Experimenters  
Navy and Wartime Research Experiments  
Notebook, N-17-02-06.1**

This notebook was used during February 1917 by Edison, E. Rowland Dawson, and Absalom M. Kennedy for notes pertaining to Edison's work for the U.S. Navy during World War I. Also included are notes on recording experiments similar to the material in N-16-11-13 and N-17-01-06, Notebooks by Edison and Other Experimenters—Recorder and Recording Experiments—Miscellaneous Books. The book has been used in both directions. Taped between the inside front cover and the flyleaf are two pages of notes by Dawson on submarine signaling. These are followed by notes by Edison and Kennedy on experimental recordings and recorder tests. Following the recorder tests are notes by Dawson on "Submarine Night Visibility Tests" and on an "Extension Ladder to Waste Baskets" for use aboard ship. At the other end of the book are several pages by Dawson regarding a visit, ordered by Edison, to a doctor in New York City for eye tests. These tests were undertaken in connection with the search for methods of keeping the pupils of rangefinder users dilated for more sensitive night vision. Additional information on these night vision tests can be found in N-17-01-20, Notebooks by Edison. The pages are unnumbered. Approximately 30 pages have been used.

6955  
Hamm, Co.,  
MFG. STATIONER,  
96 JOHN ST.  
AND  
19 PLATT ST.  
NEW YORK.

### Submarine Signal Co.

Receiving apparatus consists of  
2 tanks on fore peak of vessel  
as far below water line  
as possible, one on port  
side, the other on starboard  
Wires run to battery and thence  
to indicator box.

In each tank (16" x 32" x 8")  
are two microphones immersed  
in water, which receive sounds  
coming through water and striking  
sides of vessel.

Two telephone receivers, one  
for each side of vessel are  
used on indicator.

Above used very often with  
for fog signals. Bell struck  
by compressed air, heard 16 miles  
at British Naval test

(Submarine Signal Co., Boston  
+ 68 Broad St. New York.  
(Pamphlets on Submarine Signals  
Allingham Tom - Submarine Signaling  
Boggiano - An Italian paper  
Estroza - a Spanish "  
Fay N J W - Paper for American Electric Engineers  
Elison H R - Article in Technology quarterly  
Segrande - a French paper  
Millet - Marine Engineer  
Mundy - Triangular Location stuff  
Packard of Boston - Paper  
Schubert - a German paper  
Talbot F A - London Works Work  
H D Hydrographic Office paper 1909  
Wolf - a German paper

## SEXTET

Soprano & Baritone too low  
Drum too sluggish -  
Not bring out each  
singer clearly -  
Too much confusion  
in it - There is a  
shaker in it ;

BACH AIR

Base entirely too  
weak, should  
dominate —  
heard one blue

FUNERAL MARCH  
BEETHOVEN

Blubs - Bass too  
weak -  
all too weak -

There is a high in this  
that I don't understand

## PIANO TEST

a) Regular

No swell no overtones

b) Bottom Board replaced  
by cow hair.

No swell no overtones

## TRUNION TEST

a) Tapered  
(Tapered recorder also)

b) Straight  
(Standard Recorder #100)

Very little difference -

Something wrong in  
both -

## RECORDER TESTS

100 - Standard

107 -

121 -

8 -

2 -

3 -

4 -

1 -

Make these tests  
8 first from the horn

## RECORDER TESTS

7-

5-

①

Recorder & Head X  
Voice Reason

Record <sup>②</sup> E Head X  
Violin

③

Recorder & Ideal  
Piano

(11)

Reorder 5 - 1/4" Violin

① Small tube

② Regular 3/8" tube

③ 1/2" tube

Ring ⑤ Violin

① Head X - diminishing taper

② Head Y, Expanding taper

③ Head Z Expanding rounded taper

Reentry Tests at 6'

① 100

AZ

BZ

CZ

② AZ

EZ

FZ

IZ

③ 2Z

3Z

4Z

5Z

Reorder Tests at 2'

⑩ 100

1Z

2Z

3Z

⑪ 5Z

6Z

AZ

BZ

⑫ CZ

DZ

EZ

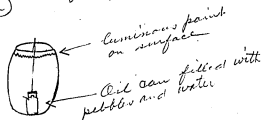
FZ

*Submarine Night  
Visibility  
Tests*

Feb 6/17

Got empty oil bbl placed in open where sun could shine on it practically all day. Filled it with water and put in a pail of salt to prevent freezing. Got oil can, filled it with rocks and attached a wire.

Put thin coating of luminous paint over top of water after submerging submarine (oil can)



Apparatus was not in position until 3<sup>45</sup> in afternoon and consequently had

only about 40 minutes of  
sunlight on it and the  
sun was rather weak at  
that.

After dark pulled the  
can up and as it was  
moonlight carried it into  
dark room.

The can should have been  
luminous but was not.  
I think probably because  
there had not been sufficient  
sun light on the barrel.

Feb 7/17

Re-immersed the can in same stuff and pulled up after dark with same result.

The day had been cloudy and some snow <sup>fell</sup> during the morning

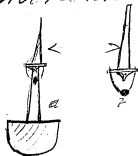
Feb 23/17

The barrel froze solidly  
on Feb 8 and ~~has~~ remained  
from ever since, in spite  
of the pail of salt  
put in to prevent freez-  
ing.

Feb 12/17

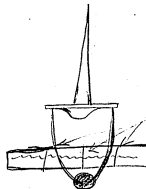
## Extension Ladder to Waste Baskets

Small model constructed  
under Mr. Kennedy's obser-  
vation.



Result - Extension swinging  
like pendulum after boat  
had ceased rocking. Ext  
swung much more than  
mast and we want in  
much less.

I suggested:



Partitions with  
many holes in it  
Cylinder half  
filled with water

Stabilizer - When weight  
swing to left water will  
run, impeded more or less  
by partitions and counteract  
swing of weight. When  
it goes to right water will  
run to left and always try  
to keep extension on even  
keel

Mr Edison says it will  
work and he will try  
something of the sort

Eye Tests

Feb 5/17

Under Mr Edison's orders went  
to

Robt G. Reese M.D.  
50 West 52nd St

who examined my eyes and found  
Homatropin + cocaine tablets  
might be put into my eyes  
"with impunity"

To show me how, he put a  
tablet containing 1/50 gr Homatropin  
Hydrobrom 1/50 gr made by John  
Wyeth + 1/300 Phila in each of  
my eyes

after sitting half hour or  
so things began to blur es-  
pecially near at hand. In  
place of one hand at the end  
of an hour, I could see 3  
attached to my right arm

Across the room things were not so bad but much less clear than normal. At the end of an hour he placed for 4 drops  $\frac{1}{4}\%$  solution of Esine (?) which contracts pupils and was intended to offset expansion caused by homotropin.

This should have brought eyes back to normal in  $\frac{1}{2}$  to 2 hours but my pupils were very much dilated 4 hours later when we went into dark room at the lab. Mr Edison was therefore much at loss because I could not see better than those with normal eyes.

He decided the dose was too large and should be put in after pupils had been dilated naturally by being in dark room.

Feb 7

Mr Edison sent Avery and Reibert of the Storage Battery to Dr Reese to have eyes examined.

The following experiment was made with them.

10.05 Went into dark room sat in chairs 15 feet from desk on which cards with following figures in black were painted 5" high.

▲ 卐 卐 卐 卐

10.22 Avery sees 卐

10.24 Reibert " 卐

10.25 " " 卐

11.20 Both read all letters on opticians card used for testing eyes. Reibert reads 4th line of numbers on card and Avery 3rd line

11.50 Reibert sees ▲

12.05 One drop Homatropin  
(15-milograms Homatropin in 6 cc  
water) placed in each of Avery's  
eyes and one drop Cocain  
(4% solution) placed in each  
of Seibert's eyes, going into  
dull light just sufficient to  
see to put drops in while do-  
ing so. All returned im-  
mediately to dark room

12.40 Their vision of cards  
about the same as before putting  
drops in. Cards again given them  
for close reading. Seibert reads  
all letters, and 5<sup>th</sup> line of num-  
bers. Avery reads all letters  
and 2nd line of numbers. This  
means 1 line improvement for  
Seibert. Avery remains the same  
as before drops.

12.45 to 50 stood in doorway  
looking towards light then  
returned to dark room

1.00 A.M. Avery (Homatropin)  
reads all letters and one line  
lower than before on numerals  
Reibert didn't see quite so  
well. He read all letters but  
with more difficulty and didn't  
try numerals.

1.02 Went into strong  
light but were careful not  
to look at bulbs. Avery  
read ordinary print out  
of booklet. Reibert could  
not read it.

1.07 Went back into dark  
room. Avery within 30 sec  
read all but last line of  
letters. Then handed card to  
Reibert who couldn't see  
any letters.

1.15 Avery sees as well as  
before going into light. Reibert  
sees very little.

**Notebook Series -- Notebooks by Edison and Other Experimenters  
Navy and Wartime Research Experiments  
Notebook, N-17-08-25.1**

This notebook was used during the periods August-September 1917 and March-April 1918 by Edison, Henry G. Wolfe, and several other experimenters for notes pertaining to Edison's work for the U.S. Navy during World War I. At the beginning of the book are entries by Wolfe and an unidentified experimenter relating to experimental work on the water kite or kite rudder at Sag Harbor, New York, and others areas along the Atlantic coast. There are also notes by Wolfe regarding tests of decoy smoke screen pots. Other entries by Wolfe describe a series of camouflage experiments using colored paint conducted during September 1917 near Gardiners Point in Long Island Sound. Also included are notes by an unidentified experimenter on torpedo detection experiments in March 1918. The remaining entries from 1918 pertain to sound detection experiments by Edison, Wolfe, and two unidentified experimenters at Key West, Florida. Some of this work was done aboard the USS *Sachem*. Included is an 11-page note by Edison from March 30, which is the only extensive Edison entry in the book. The pages are unnumbered. Approximately 90 pages have been used. Several loose pages have been inserted into the book, and at least one page has been removed.

75428  
*Acme Co.,*  
MFG. STATIONERS,  
96 JOHN ST.  
AND  
19 PLATT ST.  
NEW YORK.

Wolfe

$$P = 1.51 A V^2$$

Water Kite

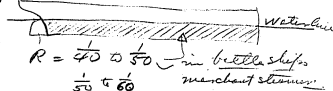
$$P = \frac{D}{g} K A V^2$$

$A = \pi$   
 $V = \text{Vel} / \text{sec}$

$$K = .90$$

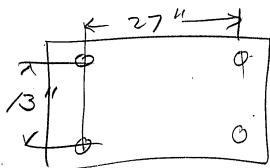
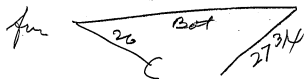
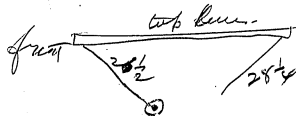
$D = \text{density of } \overset{\text{salt}}{\text{water}} = 64 \text{ lb} / \text{cu ft}$

— middle-line plane  
fore + aft or submerged sec.

 Waterline

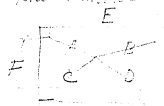
21<sup>st</sup> day. 21 ft. Cy.  
2 probosc. 41 ft. 12000  
80 H<sub>2</sub>O turbine 10000 ft.  
Range 12500 ft.  
27 Kuch. - Butterfield  
30 Kuch. 10000  
Variation of 2 Kuch.  
2000 Kuch. 10000  
2800 ft. air Pres.  
32 ft. air Pres. 52 ft. water  
Head - Air - 100 ft.  
alt. 100 ft. high  
at 100 ft. 500 ft. Pres. 500 ft.  
500 ft. Pres. 500 ft.

Aug 25  
Kite Rudder



dyg fada  
pale redness

Aug 27-0



Coastline  
area for  
adjustment

Rd. length F

E  
C  
A  
B  
D

15.00  
12.00  
16.00  
13.00  
18.00  
17.00

new data

first visit

Adm.

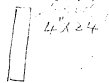
21  
23  
241

|           | I    | II | III        |
|-----------|------|----|------------|
| Immersion |      |    | 15"        |
| A         | 14   |    | 21. 1/4"   |
| B         | 20   |    | 17"        |
| C         | 13   |    | 21. 1/4"   |
| D         | 18.5 |    | 22.5"      |
| E         |      |    | 15.5 - 16" |
| F         |      |    | Found 16"  |

One I - Done

Base

III And by with 1" board on  
near for 33 1/2" base



acted ok, slight pulling  
with a few down in story  
inside, inside, inside  
Rein. rope, above at ring

11'  
24'

weighed a little forward  
did not sink.

May 26-19

Immersion

A  
B  
C  
D  
E

Jan. 1892 last test.

mill tiller  
and Kite handle  
tiller above

admission  
18'  
15'  
30'

C  
D

13.5  
20.85

with the last test. Admission



above, - 32

9 10

7+2

X

7  
admission at 1890

| 21   | 22   | Kil. along | Both |
|------|------|------------|------|
| 1.8  | 2.25 | 18.5'      |      |
| 2.60 | 19'  | 12'        |      |
| 2.25 | 2.25 | 18.25'     |      |
| 1.8  |      | 33'        |      |

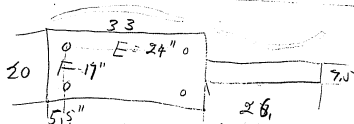
James Center

Dimensions

C

D

18.5  
18.25



Capt. Potter-Barrel Staves

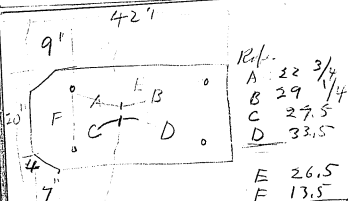
Kil. Read. to along  
with filler & kiln

Advance  
33  
33  
16.5

with filler only

31.5  
35.0

Advance beyond from low to  
low point of boat head corner  
90°.



Ref.

|   |      |                |
|---|------|----------------|
| A | 22   | $3\frac{3}{4}$ |
| B | 29   | $1\frac{1}{4}$ |
| C | 27.5 |                |
| D | 33.5 |                |

---

|   |      |  |
|---|------|--|
| E | 26.5 |  |
| F | 13.5 |  |

Judge Kate Rudder

Adrian

Kite Rudder only

Kirk Rudder only { 18

Since 7 Dec 201  
Capt Patterson Barrett, Harv

Kate Ruden and sister 22

~~Andles only~~ 20.5

$$\rightarrow \text{Kite} \quad / \quad \rightarrow \begin{cases} 22.8 \\ 2.2 \end{cases}$$
[illegible]

Length of line = 15 ft

Capt Patten Board Member

Immun

A-30

B-28

C-29.5

D-28

Address  
Hite Parkgate & 2  
Rite & Jille 18.5  
" " " 18

Some where on the Atlantic

Capt Patten

Sq Rig sloop rig  
- steam ship -

Capt Patten tried out scheme  
of dense smoke for to move  
before wind.

Used a slab of wood for  
fuel - broom sticks for most  
churn cloths for sq sail -  
bunk of tin can for smoke  
stack - also built for ballast  
+ pieces of 1 x 4 scrap wood  
for rudder -

Used oily waste for  
fuel -

After three or four trial  
trips - he succeeded starting  
off in a perfectly successful  
manner before the wind.

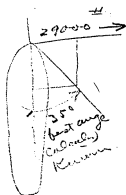
Trial trip made at

Gardner's Bay Aug 27 - 1917.

Mr Edison - approved.

Took five men in a dory to  
start her on her Maiden Voyage. (5)





$$\begin{array}{r}
 \text{Wgt of Steel } 675 \\
 \hline
 1425 \\
 \hline
 2100 \\
 + 5\% \\
 \hline
 2205 \\
 \hline
 \text{Total}
 \end{array}$$

$$\begin{array}{r}
 \text{Buoyancy of Wood } 975 \# \\
 \text{Wgt of Steel in } H_2O \quad 580 \# \\
 \hline
 \text{Positive Buoyancy} = 395 \#
 \end{array}$$

2.35 + 2.38 = 4.73

215  
634  
02 06-19-2001

187  
 182  
 184  
 3 1/2  
 180  
 185  
 186  
 187  
 188  
 189  
 190  
 191  
 192  
 193  
 194  
 195  
 196  
 197  
 198  
 199  
 200

147 fols. 270 lines.

$$7850 \text{ v. op}^2 =$$

7854

1005

7254  
600

53632

00634172

1. *Chlorophyll a* (Chl *a*)

$$F_{\text{max}} = 0.97 \text{ per } F_{\text{min}} = 0.97$$

$F = \frac{1}{2} \rho v^2 C_D$

$p = \text{absolute probability}$

$A = \text{area of circle} = \pi r^2$

$$F = \frac{.00634 \times 215.9\%}{1.0} = \frac{.00634 \times 183.4 \times 60}{60}$$

1.163 *Aspergillus fumigatus*  
HR

$$\begin{array}{r} 1.63 \\ 147 \\ \hline 8141 \end{array} \quad 33 \overline{) 271.16} \text{ min}$$

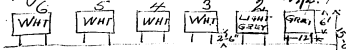
4652  
1163

$$270.961$$

$$\frac{271 \times 60}{33} = 492 \text{ ft. each}$$

Camouflage Colored Paint  
 Fort Ruess off Jordaniers Point.  
 Sep. 11/14/1917.

Experiment No. 1.



Very light white, clouds along  
 sky line, clear blue sky above.

Height of Eye above water line  
 Sitting - 4'-8"  
 Standing 4'-0"

| TIME.   | STAT. MILES | HEIGHT<br>EYE | Observed<br>REMARKS | REMARKS.                                                                    |
|---------|-------------|---------------|---------------------|-----------------------------------------------------------------------------|
| 1-41-10 | 0.          | 4'-8"         | EYE                 | STARTED FROM SHORE<br>up to 1000.                                           |
| 1-41-50 | "           | "             | "                   | No 1 least visible.                                                         |
| 1-42-00 | .236'       | "             | "                   | 1+2 appear to be<br>round & smaller<br>others square & strongly<br>visible. |
| 1-53-25 | 1.59        | "             | "                   |                                                                             |
| 1-53-25 | 1.59        | "             | GLASS               | 1+2 square, no 1<br>faintest and getting<br>nearer to color of<br>sky line. |

| TIME    | miles | Height | aperture<br>by    | REMARKS.                                                                                                                      |
|---------|-------|--------|-------------------|-------------------------------------------------------------------------------------------------------------------------------|
| 1-56-30 | 2.99  | 4'-8"  | Eye.<br>+glasses  | Strong reflection<br>of white houses on<br>the water -<br>a shade reflection<br>of No 2 - none of<br>No 1.<br>Can't see Sand. |
| 2-00-00 | 2.46  | 4'-8"  | Eye or<br>glasses | Object + reflection<br>run together and<br>makes objects 1-6<br>look twice as large                                           |
| 2-03-40 | 2.91  | 4'-8"  | Eye               | No 1 nearly gone.                                                                                                             |
| 2-04-40 | 3.04  | 4'-8"  | GLASSES           | Reflection + object<br>blend together making<br>nothing. Objects look<br>3 or 4 times higher<br>192 HULL DOWN.                |
| 2-50    |       |        |                   |                                                                                                                               |
| 2-05-50 | 3.20  | 4'-8"  | Eye               | No 1 gone.                                                                                                                    |
| 2-07-00 | 3.34  | 4'-8"  | glasses           | No 2 gone.                                                                                                                    |
| 2-08-00 | 3.47  | 4'-8"  |                   | No 3, 4, 5-6 come + go<br>due to mirage effect<br>on water - like<br>heat waves over a<br>hot stove.                          |

| TIME.   | Dist.<br>miles | height                                | observed<br>by | REMARKS                                                                                      |
|---------|----------------|---------------------------------------|----------------|----------------------------------------------------------------------------------------------|
| 2-09-30 | 3.66           | 4'8"                                  | GLASS          | ALL GONE.                                                                                    |
| 2-10-40 | 3.69           | 10'0"<br><i>slightly<br/>nebulous</i> | Eye.           | Can see all -<br>No 1 Very faintly<br>Reflex, makes objects<br>appear 2 or 3 times<br>higher |
| 2-12-10 | 4.03           | 10'0                                  | Eye.           | No 1 gone.                                                                                   |
| 2-14-00 | 4.25           | 10'0                                  | Eye            | No 2 gone                                                                                    |
| 2-15-20 | 4.45           | 10'0                                  | glass          | No 1 flickering badly                                                                        |
| 2-16-00 |                |                                       |                |                                                                                              |
| 2-17-05 | 4.65           | " "                                   | glass          | No 1 gone                                                                                    |
| 2-17-20 | 4.70           | " "                                   | glass          | No 2 gone                                                                                    |
| 2-17-45 | 4.74           | " "                                   | "              | 3-4-5-6 flickering                                                                           |
| 2-18-05 | 4.77           | " "                                   | Eye            | 3-5 gone. <i>badly</i>                                                                       |
| 2-18-35 | 4.85           | " "                                   | glass          | All gone.                                                                                    |
| 2-19-10 |                |                                       |                | turned about                                                                                 |

Notes:  
Violets were composed  
of Red-Blue + white + acute  
mixed.

Common Ledge (Paint)  
Fort Ruins of Gardiners Island  
Sept 12 1917

Exp- No 2- 5 4 3 2 1

|                             |                             |                      |                     |       |                 |
|-----------------------------|-----------------------------|----------------------|---------------------|-------|-----------------|
| 4" RED<br>1" YEL<br>1" BLUE | 4" RED<br>1" YEL<br>1" BLUE | 2" DARK<br>1" VIOLET | 1" VIOLET<br>1" YEL | WHITE | Small<br>no. 11 |
|-----------------------------|-----------------------------|----------------------|---------------------|-------|-----------------|

Water Line

Glassy Sea + bluish sky line  
very thin clouds (cirrus + alto), some  
times over some

| TIME    | STAT<br>MILES | HEIGHT | BY<br>OBSERV | Remarks                                                                                                             |
|---------|---------------|--------|--------------|---------------------------------------------------------------------------------------------------------------------|
| 1-0930  | .4            | 4'-8"  | Glass        | Sharles from ship<br>700 yds from ship.<br>1, 6, 3, 4, 5, 2. Visibility<br>least visible given 1st<br>in all cases. |
| 1-14.55 | 1.10          | 4'-8"  | Eye          | 1-4-3-6-5-2. Visibility                                                                                             |
| 1-20.55 | 1.88          | 4'-8"  | Eye          | 1 4 3 6 5 2 "<br>no 13 can only seen<br>thin cloud over some                                                        |
| 1-22.45 | 2.12          | 4'-8"  | Eye          | 1 4 3 6 5 2 Visibility                                                                                              |
| 1-26.30 | 2.6           | " "    | "            | gavel bank <del>and</del><br><del>to board</del> still 1/2.<br>sky line not up<br>to board jet.                     |

[153]

| Time    | Lat<br>miles | Height<br>Eye | observed<br>with | Remarks.                                                                       |
|---------|--------------|---------------|------------------|--------------------------------------------------------------------------------|
| 1-27-35 | 2.74         | 4'-8"         | glass            | commence to get Reflec.                                                        |
| 1-27-50 | 2.84         | " "           | glass            | Strong reflec. from<br>No 2+5 - none from<br>No 1                              |
| 1-29-30 | 2.99         | " "           | glass            | Strong reflec. con<br>still see govt bank<br><u>Sun clear</u>                  |
| 1-32-00 | 3.39         | " "           | glass            | Sun clear. Object<br>& reflec. run together<br>on #1-4-5+6.<br>No so with 2+3. |
| 1-37-30 | 4.28         | " "           | glass            | No 1, 2 3 6 5 2 Visibly<br>Sun clear getting some<br>reflection yet.           |
| 1-41-30 | 4.54         | " "           | Eye              | No 1 invisible                                                                 |
| 1-42-00 | 4.61         | " "           | Eye              | 5+6 invisible                                                                  |
| 1-42-30 | 4.67         | " "           | "                | all invis. except No 2.                                                        |
| 1-43-00 | 4.73         | " "           | glass            | Only 2+3 visible<br>appear above skyline<br>flackering -                       |
| 1-43-30 | 4.80         | " "           | glass            | all gone.                                                                      |
| 1-44-30 | 4.93         | 10'-0"        | glasses          | no 1, 2, 3, 6, 5 + 2 visible<br>Reflec. 2 1/2 times as<br>high as wide.        |
| 1-46-45 | 4.94         |               | Eye              | No 1 gone                                                                      |

Time

|         |      |        |       |                                        |
|---------|------|--------|-------|----------------------------------------|
| 1-50-20 | 5.68 | 10'-0" | Eye   | Only No 2 can be<br>surely seen.       |
| 1-51-10 | 5.8  | 10'-0" | gloss | flickering - no 1 gone                 |
| 1-52-00 | 5.8  | " "    | gloss | only #2 & 3 flicker<br>badly, no 1 & 4 |
| 1-52-40 | 5.94 | " "    | gloss | Can see only No 2<br>which flickers -  |
| 1-53-00 | 6.02 | " "    | gloss | All gone.                              |

Direction taken from target  
South West by West  $\frac{1}{2}$  West

Camouflage  
Ruins H. Gardeners Print

Sept 18-1917

Exp. J. No 3

No 1 - Gray

No 2 - 90% Black 10% white

No 3 - 80 20

No 4 - 70 30

No 5 - 60 40

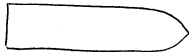
No 6 - 50 50

|         | Miles | Height | at ground with | Remarks                       |
|---------|-------|--------|----------------|-------------------------------|
| 3-37.00 | 4     | 4'-8"  | gray glass     | Scattered at boat No 2 Point. |
| 5-40.00 | 1.19  | " "    | Org.           | No 2 Hazy                     |
| 5-43-50 | 1.28  | " "    | eye            | No 2 gone                     |
| 5-46-25 | 1.62  | " "    | glass          | No 2 gone                     |
| 5-46-20 | 1.63  | 10'-0" | " "            | Wrote on top of cabin         |
| 5-47-10 | 1.85  | " "    | glass          | No 2 gone                     |
| 5-52-40 | 2.42  | " "    | eye            | gravel bank plain, Vis.       |
| 5-56-30 | 2.92  | " "    | " "            | do. do.                       |
| 5-56-45 | 2.93  | " "    | Org.           | No 3 gone.                    |
| 5-57-10 | 3.12  | " "    | " "            | Still see gravel bank         |
| 5-58-30 | 3.42  | " "    | " "            | see gravel bank               |
| 5-59-20 | 3.44  | " "    | " "            | #4 gone                       |

S.F. 192- got in range of view  
Experiment done -

Clear over head - very hazy  
sky line - light wind moderate sea

~~Oleum 5.4.7 2.1.66~~



Oleum = 2.  
Wgt per qt; 4 lb. apx.

Use  $\frac{1}{2}$  lb. T.N.T. = 7 lb. in -

Blood powder Exp. Charge -  
Blood powder fuse with Fulminate Exp.  
to set off TNT Charge -

Oleum in ref. con.

Oleum - ignites Blood powder

" will not ignite T.N.T.

" will explode Fulminate of Mercury?  
Sensit. Fulminic Acid.

$$75.2 \times 2.375^{-2}$$

$$\frac{3/4}{3/8} \quad 2 \frac{7}{16} \text{ diam.}$$

$$\frac{2.375}{2.375} = 1$$

$$191 = \frac{231 \text{ Cu in}}{4} = 58 \text{ Cu in.}$$

Inside diam shell 2.375"

" Area 4.4 sq in.

$$\frac{54}{4.4} = 13.2" \text{ say } 14 \frac{1}{2}" \text{ for Blank Con.}$$

Make Con 2  $\frac{1}{16}$  5.2"  $\frac{1}{16}$  clearance.

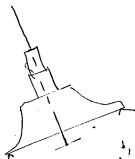
.020 thick (lin)

Inside Dean Container = 2.3125"

Area = 4.2 sq in.

$$\frac{54}{4.2} = 12 \frac{3}{4}" - \text{allowing for fillet shape.}$$

flue 22 in in 56 sec. ? Kumin.  
 $\frac{1}{2}$  inch per sec



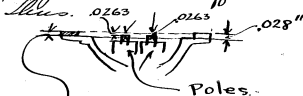
Mar 20<sup>th</sup> Am.

Order No  
5065

Started <sup>Inspection</sup> ~~Sub~~ Detection of

Mar 21-1917.

Decided to face off receiver  
& replace and cut off with rubber



Poles.

Face off 0280"-

Make stuffing box for head  
of "fish"

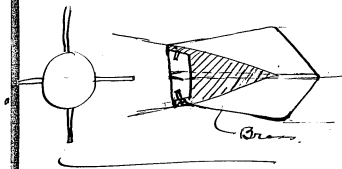


Soft rubber

over

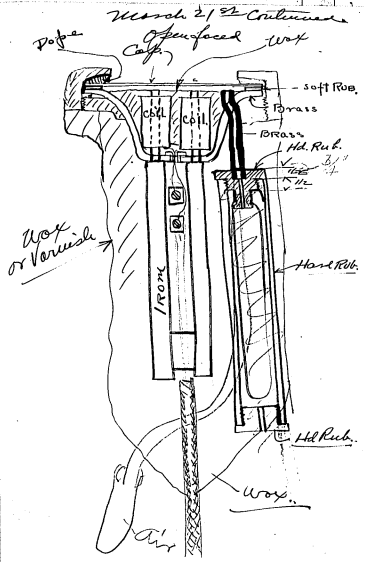
Nov 2/54 continued

Making new tail fins,  
of brass. (true & smooth)



Over

Washed 2 1/2" Crutch



Mar 21. Continued.

Must get fine polish  
on <sup>the</sup> surface exposed to water.

Mar 22-

Mar 23

According to this - Average

3 amp on element  
Sound lost at 31 points

4 amp " 42 "

Ray West Mar 25 '4

500 ohm resistor in fish - total resistance  
wire and resistor - 666 ohms.

2.5 ohm resistor as balancers -

3 stage amplifier. Fish of malogang  
painted and filled - inner core much  
shallow, detail of construction see Mar 21 '18

200 ft Cable 7 knots

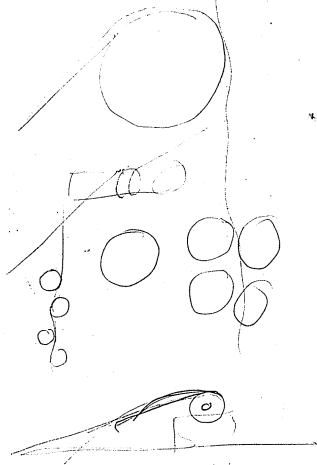
Resistance to ground 19,000,000 ohms +

5.6 to 130 P.M.

| 500 ft          | Amplifier | Moni | Notes |
|-----------------|-----------|------|-------|
| 7 knots         | 4         | 48   | 48    |
|                 | 3         | 28   | 34    |
| 200 ft Cable    | 4         | 48   | 44    |
| 10 knots        | 3         | 30   | 34    |
| Resistance OK.  |           |      |       |
| 500 ft 10 knots | 4         | 48   | 50    |
| " "             | 3         | 34   | 32    |
| Resistance OK.  |           |      |       |
| 500 ft 10 knots | 4         | 58+  | 56+   |
|                 | 3         | 56+  | 56    |
| 500 ft 10 knots | 4         | 48   | 48    |
|                 | 3         | 34   | 305   |

Resistance dropped to 700,000.

Noted noise in and in step with  
rev. of propeller both with cable



Propulsion system  
 Due to vibration of division?  
 Taken in at 930  
 resistance 700,000.

After making a cutting  
 after passing out the  
 transducer.

After making a cutting

After making a cutting

Cable - 100 ft. long, 400,000  
 20 ft. out

Last 20 ft. of cable near fish  
 = 500,000 lb.

Prop. propeller being destroyed  
 at 500 ft.

Noise - louder at 1000 ft. than  
 at 500 ft.  
 (500 ft. L.T.)

Key West Mar 26

500 ohm 15 sec in fish  
total resistance 11,000 ohms  
2-80 ohm from previous test.

1-Stage Amplifier  
fish of Muskogean type, replaced  
with same as before.

Resistance to ground 5,000,000 ohms

Stage 245  
Briny Miller Cable -

15 ft. cable Amplifier Amplifier - Change  
Resistance 4

|            |                    |    |    |
|------------|--------------------|----|----|
| 200 ft.    | 4                  | 46 | 46 |
| 10 knots   | 3                  | 32 | 32 |
| Resistance | 5,000,000 ohms - V |    |    |

Moore's Amplifier  
Needle: 1000 ohms  
Lead Cable = 2 -

|            |                    |    |    |
|------------|--------------------|----|----|
| 400 ft.    | 4                  | 46 | 46 |
| 10 knots   | 3                  | 30 | 32 |
| Resistance | 3,000,000 ohms - V |    |    |
| 1000 ft.   | 4                  | 42 | 42 |
|            | 3                  | 22 | 22 |
| Res -      | 17,000 ohms        |    |    |

|                      |      |    |     |
|----------------------|------|----|-----|
| 500 ft.              | amp. |    |     |
| <del>Quintess.</del> | 4    | 18 | 40  |
| Eng. Stepped         |      | 44 | 50. |
| but under            |      |    |     |
| momentum             |      |    |     |

Rushmore 1, 700, 000 lbs.

Person mine is harder to become  
in is more sensitive as stress in  
and in room are less

|                           |                            |    |      |
|---------------------------|----------------------------|----|------|
|                           | Tail 50 ft. Rub. Co. Cable |    |      |
| 500 ft.                   | 4                          | 18 | 40   |
| 10 ft.                    | 3                          | 38 | 50   |
| Resistance, 100,000 ohms. |                            |    | 40 V |
| Acid Value. 6.            |                            |    |      |

Eng. Stepped 4 +5

but Rigger sit

|                |              |    |    |
|----------------|--------------|----|----|
| Resist         | 100,000 ohms |    |    |
| 500 ft         | 4            | 46 | W  |
| 10 ft          | 3            | —  | 46 |
| (stepped)      | 4            | 44 | —  |
| under momentum |              |    |    |

# Old rigging for

Resistance 70,000 lb

10 feet  
500 ft.

4  
3

14  
50  
30

52  
36

10 feet  
500 ft.

4

Resist.

## Resistance Measurement Cable overboard

feet  
550  
500  
450  
400  
350  
300  
250  
200  
150  
100  
50

Resistance  
70,000  
91,000  
11  
11  
11  
11  
11  
11  
11  
11  
11  
11

feet only  
Resistance and  
Resistance in water  
Resistance only  
in water.

90,000  
45,500  
10,000,000 ft

take-out of fish

Mar 28

Ken Munt.

Mar 28-1918

550 ft of cable, total 3 stage anchoring

500 ft Cable - 10 min

500 drops necessary in fish - 1000 cc. water

Resistance { } Anden. im/

Alvin

500 ft to 1000 ft

4

65

Full pulled by rail

4.

Engine stopped

56

under momentary

Resistance to ground 5,000,000 W

with Cable pulled

1



By Cotton rope.

same as above  
with 50 pl of acetic

4

36

lying on deck

Removal from road  
At 1000 ft

Mr. [unclear]  
Mr. [unclear]

No change in firm value from method  
of firm debt.

Rest talked

more

Boat stopped. Anding. Hands. Value. 4.

fish - 30 ft deep. Noire Valve 18"

board quiet and all anxieties stopped.

With fish being pulled up and down

a few feet north of house no. 1000

[illegible]

6703

This noise has same character  
as noise heard while towing.

Ship stopped, used 4 amp  
noise value of section 6  
fish 30 ft deep  
(4 amp) Noise value = 5<sup>th</sup>  
locality near Key West about 3 miles.

| Depth -<br>50 ft.<br>10 knots. | 4 amp | Noise |
|--------------------------------|-------|-------|
| 10 knots<br>100 ft.            | 4     | 42    |
| 6 knots.                       | 4     | 44    |

Ship stopped, used value 6.  
4 amp 26 on bottom  
18 pulling up

| Lat 45° 30' N.<br>or bottom.                | 4 | 56 ft<br>probably moving on<br>bottom. |
|---------------------------------------------|---|----------------------------------------|
| or anchor<br>lat 45° 30' N.<br>or on bottom | 4 | 18.<br>Anchor value 6                  |

Walt out in boat holding.  
Cable safe from explosion

### Cable Boat

Heard Steamer ~~Indisance~~  
in 130 ~~yards~~ Distance =  
nearly 2000 ~~yards~~ 2' deep

4 cabs. ~~but hear only 4~~

~~by the way to 100 ft~~

~~by the way of air pump on Refractor~~

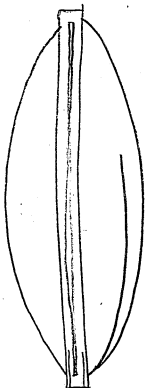
Small machinery noise

Cable out at 18.

Standing Still fish on  
bottom 200 ft. Cable out  
and at 4 cabs..  
Small machinery noise heard  
+ lifted out at 18.

### Standing Still

| 400 ft out.                                                                   | Anderson             | Noise Value. |
|-------------------------------------------------------------------------------|----------------------|--------------|
| at bottom                                                                     | A                    | 20.          |
| Resistance to ground                                                          |                      | 3,000,000    |
| 400 lbs of cable<br>out pulled 30 ft<br>and 4 cabs<br>noise heard<br>trapped. | 4. amp per<br>mile 8 | 28           |
|                                                                               |                      |              |
|                                                                               |                      |              |



Fish lying on bottom 400' from boat.

Anchor 4 amps noise 8

Noise 28 -

Resistance to ground 5,000 ohms  
with lead weight tied to cable  
10 ft from fish.

Anchor Voltage 8

Amps 4 Noise 20.

4 brass fins on brass strip placed  
on cable 20' in front of fish  
Anchor voltage 8  
Amps 4 - Noise 26

Resistance to ground 24,000 ohms

500 ft Cable - with brass fins on  
cable 20 ft ahead of fish at 10 points  
Noise = 48 -

Details of above brass fins  
on opposite page.

Plugged hole 4X  
over

Plugged hole in wire 44.

500 ft. 4 amps.

Noticed snap every 10 or 12 seconds, preceded by a buzz & followed by a musical note.

250 ft. 4 amps 40

Snap every 20 seconds -  
preceded by buzz — 3  
musical notes gone.

100 ft. out. brass squid  
Don't sink.

350 ft. out. Resistance 90,000 ohms

↑

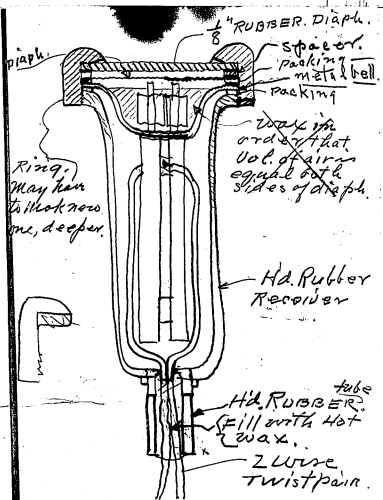
200 ft. 4 amps 48 ✓  
10 knot.  
Resistance 30,000 ohms.

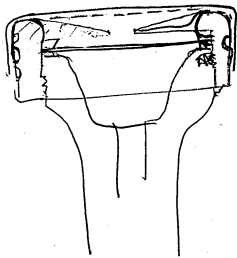
500 ft. — 4 amp. — 52 ✓

Resistance 70,000 ohms.

5 bars 4 — 56 ✓  
500 ft.  
Resistance 60,000

Mar 28





March 10

Have found that most of the noise on towing line is due to mechanical waves on the towing line - These waves are transmitted along the tow line by vibration of water friction & the boat. Perhaps if the waves the diaphragm picks them up + with hear them 35 to 50 on cushion box at 500 ft. They are slightly less at 1000 ft. If boat has engine & auxiliary shut off suddenly it does not diminish showing its ~~not~~ not boat sound but mechanical waves thrown on the tow line

today & laid out 100 ft of tow line on dock by placing

Cable in teeth & dragging  
the 100 ft. of cable across the  
boards of the deck the  
noise was fearful, continuous  
except where rough splint on  
deck, this gave a snap

In fact it acts just like a  
phone stylus worked on  
friction principle - Even  
rough splint on deck &  
cables throw waves into  
the wire -

Teeth from impact bar

direct

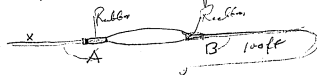
100 ft

If I interpose a piece of  
Rubber to take strain

Rubber

Q

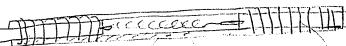
then no sound is heard in teeth  
Wolfs reeled up a fish line



by pulling at X - the boat & 100  
ft cable dragged but no  
sound transmitted to teeth  
at X yet at B the sound  
was terrible -

This Rubber insert kills  
the mechanical waves -

In practice we can  
insert 2 or more of  
these rubber deadeners  
in tow lines



Rubber - small  
spiraled connection wire -  
joints well fused no no  
water gets in -

Entire strain is taken by  
Rubber tubes & vibration  
stopped. Rubber tubes  
should be 8 @ 10 inches  
long & stand 60 lbs  
without breaking or collapsing

one of these inserts can  
be put 100 ft from  
fish & one within  
1 ft of fish, or right  
on fish -

Another Experiment  
we tried was to drag  
100 ft Cable over dock  
to see if it electrified  
and use Audion  
3 stage -

Then got 12 on the  
box - Audion 2

This was with Cable  
smooth rubber

When we substituted the  
twisted 2 wire  
Cable the noise went  
to 45 on box at the  
twist got great knock -  
Therefore the Cable is  
Electrified by rubbing  
on boards -

But previous tests  
show on 8 on box - (1/2 cu)  
with 1000 ft at  
10 knots in water  
without fish or phone

showing that we do  
not need fear electrification  
here -

We are trying galvanic  
currents now -

If two wires connected  
to primary of induction  
+ wires lowered over  
boat into water  
get no sound in induction  
still or moving  
both wires coiled  
also brass plate  
q was 14 on box

If a large plate is  
connected (Iron galvanized)  
is used with 1 wire  
+ bare wire on other  
no sound in audion

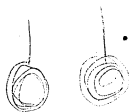
If Brass plate is  
used just hear 3 @ 4  
faint on audion -

With Iron galvanized  
connected to 1 wire  
and the boat to  
the other wire,  
got 14 on audion

this looks as if we had  
at boat a clean  
Copper plate + diths  
on fish, we can  
use the Earth return  
+ a single conductor  
Cable -  
this would simplify  
Matters.

Two Copper wires each  
3 ft long bare put in  
sea - no noise on  
audion, moving  
+ still -

Measured the Resistance  
between the wires -



wires coiled up -

We find that there is a  
Current from these wires  
but as its own power  
& steady it don't  
make noise -

Known Sago Resistance  
is less than 3  
ohms -

Same phone as before, May 21  
with ribbon out 2 ft for fish.

Key West May 31 - 1890

Using same phone as usual, May 28 & 29  
w. 3 stage operation.

Smooth 1/4" cable

Resistance of 1 ft. in 1 ft. ground section.

Butter time placed in ground, back

cable over fish with two

small magnets, may enable to

carry current back up the phone.

250 ft cable

7 ohms.

Resistance 500 ft cable

10 ohms.

Resistance

500 ft cable

Resistance

Resistance

Resistance

Resistance

Resistance

Resistance

Resistance

Resistance

Resistance

Resistance

Resistance

Resistance

4 38

4 38

4 38

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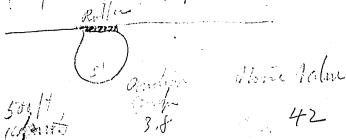
4 38

4 38

4 38

Mr. Edison made his place  
1 ft. each shell sound, 1/2 ft. each  
cathode diam. sound made  
1st firing, 1/2 ft. each  
pages 1/2 ft. each, 1/2 ft. each  
6 to 15 ft. each, 1/2 ft. each  
1/2 ft. each, 1/2 ft. each

100 ft in front of fish-looker



Distance to ground 400,000 ft

500 ft cable pulled from 30' down  
from stem

|                   | Amperage | Stone |
|-------------------|----------|-------|
| 500 ft 11 ft long | 3.8 amps | 46 ✓  |
| 500 ft 2 ft long  | 3.8      | 52    |

Distance 10,000,000 ftms. ✓

100 ft Cable coming from 30' from  
forward. fish rods near stem  
Resistance 500 ft 3.8 amps  
Rubber tube connected between  
cable and fish  
Clearing mud from  
head & even ground & nose  
100 ft 7 amps, 3.8 42

Resistance 100 ft 3.8  
500 ft of cable pulled from 30' down  
from stem  
500 ft 11 ft long 3.9 amps 36/40  
Clearing mud from  
nose of screw.

With hot water momentary  
and engine unit down nose - 34

Same Phone as shown on  
March 21 - exact 20 in rubber  
exp joint is attached to nose of  
fish + fish is wire filled  
instead of water filled  
wire

Same phone as  
One Cable-lane  
Disconnected.  
10 Kuch 3,8amps. 50,  
500 ft.

April 1 - 1918

with telephone in fish with air made  
Pasovim water and must tell as  
sounded sound

David Kelly

*Arctium angustifolium*

3, 6

115 A

Med same place as in Mar 31 exp.

Put telephone in water without fish

Andean angs 3.8

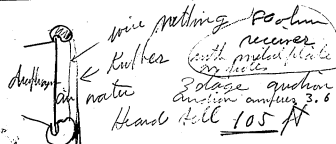
Search 4 all

Seared full  
water shallow in which full was used

10. Systeme Petreum doch

$20' 18'' \times 5' = 125'$

→ In deep water  
Telephone out of reach  
Anchor 3.8 miles distance 375'



This telephone is extremely sensitive in air. Water on one side air between rubber and diaphragm - Butler 122

Removed with diaphragm

Hard All

Ammon 3.6 amf

251

At

April 2-1918  
 50 lbm. placed in water  
 with rubber diaphragm over  
 a  $\frac{1}{32}$ " brass plate containing  
 $\frac{1}{4}$ " holes in between rubber  
 and diaphragm Heard bell  
375' - Andean ampers 3.9

Removed rubber diaphragm and  
 brass plate -  
 Heard bell 425' Andean ampers 3.8

Installed rubber diaphragm  
 backed by  $\frac{1}{32}$ " brass plate with  
 $\frac{1}{8}$ " holes Heard bell 375'  
 Andean ampers 3.9

2000  
 1000

Apr 6<sup>th</sup> Res = 495000.  
 500 lbm. Pac. Brown Ale.  
 3.5 Supp. n. Andean.  
 heard bell, ~~to water~~  
 holes against diaphragm. 354' 385  
 $\frac{1}{4}$ " hole, in diaphragm  $\frac{1}{16}$ " dia. 335 ft. 320  
 $\frac{1}{8}$ " " " "  $\frac{1}{32}$ " dia. 333 ft. 235  
 $\frac{1}{8}$ " " " "  $\frac{1}{16}$ " 335 " 330  
 $\frac{1}{8}$ " " " "  $\frac{1}{32}$ "  
 $\frac{1}{16}$ " " " "  $\frac{1}{16}$ " 305 ft. 300.

tide running away from receiving  
 towards source of noise

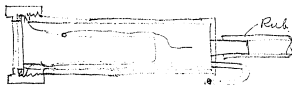
Rub. diaph. 525 - 720 Supp. 1. 254,  
 335

354  
 304  
 254

Still test off dock.

April 4<sup>th</sup>.

500 lb. resin - packed  
in Brass shell, airtight, with  
washers.



long rubber tube  
air & water.

Air on suction 3.5

South bell out in boat

Peak bell.

|                                     |          |
|-------------------------------------|----------|
| Water against diaph.                | 1225 ft. |
| Rub. sheet on $\frac{1}{4}$ " holes | 1215 ft. |
| " " " $\frac{1}{16}$ " holes        | 1100 ft. |

The rubber sheet was backed  
up by a brass plate  $\frac{1}{8}$ " above  
of the regular diaph.  
the first one consisted of  $\frac{1}{4}$ " holes  
drilled  $\frac{1}{2}$ " apart + the 2<sup>nd</sup>  $\frac{1}{16}$ " holes  
 $\frac{1}{2}$ " apart - + this sheet rubber  
stretched over these discs  
There was little dif. between

(101)

the water against diaph.  
+ when disc with  $\frac{1}{4}$ " holes  
was used - but quite a fall  
off when the  $\frac{1}{16}$ " holes were used.

W. J. F.

Steel test off dock.

April 9 -

Took same phone in metal  
case, described Apr 8. +  
connected it with new one  
described by drawing, "A"  
+ which I used case neophone  
in that experiment -

We placed both phones on tray  
off dock + as weather was  
too rough to go out in boat  
we ran cable on opposite side  
of dock at a constant distance  
+ added resistance to line until  
ring of ~~bell~~ was just out.

As  
Camp on Audion 4.-

Neophone - noise written out at 50  
old phone " " " " 44

Neophone <sup>250 ft. cable</sup> had resistance of 173 ohms  
old phone had resistance of 516 ohms

W. J. F.

There was very little difference in the audibility of the two phones - except the old one seemed to be a more natural tone,-

In touching the supporting strings of each cable the new one was very noisy while the old one was quiet,-

wave.

Key West April 10 - 1914

On dock -

Nonfunctional to antenna

Primary of antenna connected to case

Noise value in room  
frying occasionally

2

A No ground on case

Same with primary not connected to case

75' army field cable laid on dock and connected to support

B. Noise like commutation

Noise value

10

Primary not grounded to case

75' army cable stretched 7' high along dock - Noise

15

Primary not grounded to case

C. Case not grounded

Noise value

36

Primary middle point connected to case

noise value

2

Case grounded - Primary middle connected to case

2

95' Cable -  $\begin{matrix} 75' \\ 40' \end{matrix}$   
 { End 40' high - Value 8  
 Primary not grounded Case not grounded  
 " " " Case same - 10  
 End 10' high  
 Value Primary not grounded 4  
 Case not grounded  
 Case grounded 10

Note: noise heard was very much  
 like commutator noise traced the  
 to telephone cable along deck.  
 In those cases where noise was  
 loud, cable was near and  
 parallel to telephone cable.  
 When run right along side  
 maximum noise was obtained.

Key West April 15, 1918  
 A - 500 ohm phone in brass container -  
 water against diaphragm  
 B - 500 ohm phone in fish with  $\frac{1}{32}$ " hole in  
 brass plate covered with  $\frac{1}{32}$ " rubber

|   | Relative Values |    |    |
|---|-----------------|----|----|
| A | 34              | 32 | 44 |
| B | 30              | 26 | 40 |

Key West Apr. 15, 1918  
 3 or 500 ohm phones mounted in  
 brass containers with water  
 against diaphragm.

I - air compensation for pressure.  
 by means of rubber tubing  
 II - diaphragm not compensated  
 telephone in copper tube in fish  
 system to nose of submarine  
 charging. Used standard cable  
 try to get values of noise  
 depth submerged

|             | I   | II |
|-------------|-----|----|
| Noise value |     |    |
| 2 ft        | 42  | 48 |
| 10 ft       | 56+ | 36 |

April 16-1918

|        | Installed   |    |    |
|--------|-------------|----|----|
| 1.5 ft | outside     | 38 | 40 |
| 5 ft   | compensated | 44 | 44 |
| 10 ft  | on #II      | 52 | 42 |

with copper tube removed  
 value = 56+ # II phone  
 set on

Key West April 17-1918

Installed rubber washers on  
diaphragm on # II phone  
First phones in water # II phone  
not in fish. Most tell as source of sound.  
Ref. to Morris

|                                             | I   | II  |
|---------------------------------------------|-----|-----|
| 5 ft                                        | 50  | 50  |
| 10 ft                                       | 3.2 | 3.2 |
| with # II phone in<br>Copper tube of fish * | 46  | 46  |

\* Audion amp. dropped 3.8 to 2.5

Key West April 19-1918

Phone I - 500 w receiver in hours  
contains water against diaphragm

" II - 1000 w. liquid receiver in  
fish - diaphragm separated to form  
left line of fish - receiver ~~in~~  
in air chamber produced by cylindrical  
brass piece with 1/8 holes covered by  
1/2 rubber

III 500 w receiver in copper tube  
fish water against diaphragm  
after tube ~~proceeding~~  
separating phone case and copper tube

IV 500 ohm receiver in air chamber  
enclosed by rubber sheet <sup>audion</sup> ~~plastic~~ <sup>other</sup>  
two plate containing holes. 1/8"

Resistance to ground  
Resistance to ground # II = 1,000,000 w  
2 5 ft. of cable in water

# I = 120,000 +  
# III = 17,500  
# IV = 500,000

Rel in boat out about  
300 ft. used standard cable box  
to compare values.

Number I phone

" II "

" III "

" IV "

None of bell

42

4

4 1/2

4 1/2

found lead on #2 open  
Repeated test boat about 300 feet  
away

Number I phone

II "

III "

IV "

None Value

44

40

40

44

Rel West (21-29)

On Coast, 500 ft of cable - 1000 ft lead cable

resistance in fish II None 20

7 hrs. Andromeda 4 50+

Resistance Logans 1000 ft lead

Andromeda 1000 ft lead

Cable lead 20 ft from boat in town

500 ft cable 500 ohm phone # III

7 plants None 34

10 plants " 34

Resistance, 1000 ft lead, +

Note the heavy on the fish is

solid. Very good conclusion of

sound,

500 ft cable 500 ohm phone # IV

7 plants None 50+ M.K.

7 plants (Mr. Elmer " 10

Resistance to ground 50,000 ohms.

250 ft cable phone IV

7 plants None 50+ M.K.

Mr. Elmer " 12

1000 ft cable phone IV

7 plants held cable close to boat

END

None - load brooks heard in  
throng - None correct, checked  
distance & count 94,000 ft.  
Worked cut 6 in and found fish on  
rubber line had parted

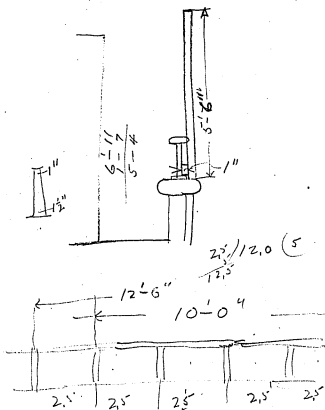
#III - Not hollow tail on,  
250 ft. from lead, legends  
at regular intervals about 110 ft  
apart

at 50 ft heard some brooks  
less pronounced.

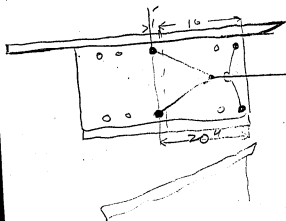
#III Run 500 ft - 1 with hollow tail  
Picked from 200 ft near top  
75 ft of cable  
None

24

Ran 1000 ft to ground 20,000 ft  
Disassembled telephone and found same  
insulation due to disfigurement not being  
properly centered.



10 1/2





$$\begin{array}{r} 7.25 \\ 57.3 \overline{) 60} \times 5.75 \\ \underline{46} \end{array}$$

$$\begin{array}{r} 46 \overline{) 57.3} \mid 125 \\ \underline{46} \\ 113 \\ \underline{92} \\ 210 \end{array}$$

$$\begin{array}{r} 5.75 \\ 75 \\ \hline 2875 \\ 4025 \\ \hline 43025 \\ 425 \end{array}$$

$$\begin{array}{l} 52 \quad 30'' - 30'' = 52 \\ 10 \quad 8' - 80 \end{array}$$

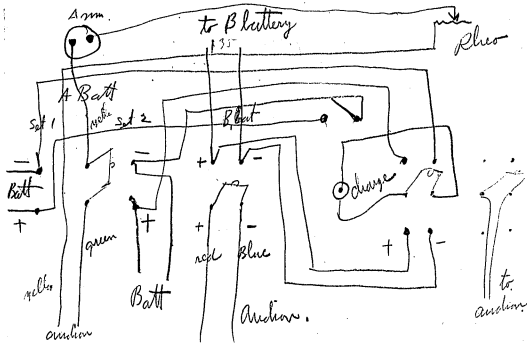
$$\begin{array}{r} 52 \\ \hline 57.3 \times 60 = \end{array}$$

$$\begin{array}{r} 1.1 \\ \hline 57.3 \times 60 \\ \hline 5.2 \quad \times 5.75 \\ \hline 66 \\ 3450 \\ \hline 379.50 \\ \hline 294 \\ \hline 85 \end{array}$$

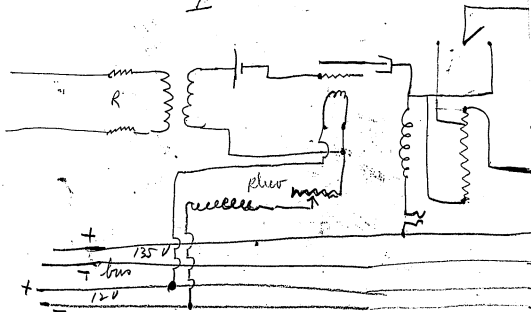
$$\begin{array}{r} 57.3 \times 60 \quad \times 5.75 \\ \hline 6730 \end{array}$$

$$\begin{array}{r} 52 \times 379 \mid 566 \\ 67 \quad 335 \quad \hline 52 \\ 440 \mid 1133 \\ 402 \mid 1430 \\ \hline 380294 \end{array}$$

[ITEM(S) FOUND IN BOOK]



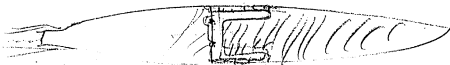
I



[ITEM(S) FOUND IN BOOK]

Key West  
April 1-1918

[ITEM(S) FOUND IN BOOK]



**Notebook Series -- Notebooks by Edison and Other Experimenters  
Navy and Wartime Research Experiments  
Notebook, N-18-02-21**

This notebook was used in February-March 1918 by William A. Hayes and William Deans for notes pertaining to Edison's work for the U.S. Navy during World War I. There are numerous notations by Edison, many of which are pasted into the book. The entries by Hayes at the beginning of the book describe a series of forty test recordings made at Key West, Florida, on a submarine, a sub chaser, and a sea plane. The recordings were intended to test the performance of submarine detection receivers. The entries in the second part of the book are primarily by Deans, although there are a few by Hayes and most are signed in the name of both experimenters. They describe sound detection experiments based on new instructions from Edison, and some include rough drawings by Edison. The inside front flyleaf is inscribed "Records made for Mr. Edison at Key West" and "W. A. Hayes." The book contains approximately 40 unnumbered pages followed by 52 numbered pages, some of which are blank. Several loose pages of drawings and mathematical equations have been inserted into the book.

PF 428

*Ames Co.,*

MFG. STATIONERS,  
96 JOHN ST.  
AND  
19 PLATT ST.  
NEW YORK

*Records made for  
in Edition at Key West.*

*W. A. Hays*

Feb 21 1918

Record #1

Made on Sub-Marine K. 3.

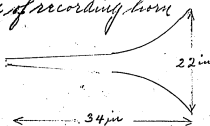
Speed of recording machine 75

Boat running on surface

Engines running full speed (325  
turns per minute)

Record made about 11 ft from  
engines.

Size of recording horn



Feb 21 - 1906

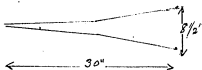
Record # 2  
made on Sub marine K. 3

Speed of recording machine 75

Boat running on surface

Engines running full speed (325  
turns per minute)

Record made about 10 feet from  
engines with smaller tube  
than one used on #1 record



Feb. 21st 1918

Record #3

Made on Submarine N. 3  
Adjusting Pump alone  
Speed of recording machine 75

Boat running on surface  
and submerged.

First haul on surface  
Second " submerged, about  
18 feet

Record made with horn 34"  
long and bell 22" diameter

Record taken at 6 feet  
from pump.

About 450 sec  
fairly strong

Feb 21 1918

Record # 4 Submarine K.3

Steering and diving  
rudder contactors

Speed of recording machine 75

Speed of boat 6 knots

Arm wire 34" long 22" diameter

Last half of record cut very  
light

Record made at a distance of  
about 3 feet

1500 sec  
Very faint

Feb 21 1918

Record #5 Submarine K. 3  
At 6 knots  
Main motor and vacuum  
pump gearing  
Taken about 8 feet from  
motor and 14 feet from  
gearing

Speed of recording machine 75

Last part of record cut very  
light

Horn used 34" long 22" diam

432  
~~750. Very faint~~

Feb 21st 1918

Record #6 Lul. Marine N. 3.

Marine power pumps

First half of record 1 pump running

Second half of record 2 pumps running

Taken about 5 feet from pumps

Speed of recording machine 75

Horn used 34" long 22" diameter

2 mi.  $\frac{1}{2}$  2 pumps  
More distant 600 sec -  
Stronger trace than  
nextory see distance  
clear cut wave

Feb 21 1918

Record #7 Sub machine K.3

Engines running full speed on  
top

Record taken about 30 feet from  
engines

First part of record cut very light  
Second half cut deeper

Speed of recording machine 75

Worm used 3/4" long 22" diameter

About 1800 to 2000 Sec  
Counting all vibrations  
350 @ 400 Sec  
Some larger vibrations

Feb 21st 1918

Record #8 Saw machine N. 3

Engines running while changing  
the tape

Record taken about 30 feet from  
engines

First part of record cut light

Second part cut lighter

Speed of machine 75

Horn used 34" long 22" diameter

Feb 21st 1918

Record #9 Submarine K. 3

Engines running while changing  
3 different depths of cut

1st deep

2nd fairly deep

3rd lighter

Speed of recording machine 75

taken about 30 feet from engines

Horn used 34" long 22" diameter

Very disagreeable

Feb 23rd 1918

K. 3 Sub Marine

Record # 10

Main Motors running with all auxiliaries

out but murgell current 23' grad

Speed of boat about 7 knots

Speed of recording machine 75-

Taken about 3 feet from motors

not large horn

Recording needle 40/1000

but a little too deep

375 per second

Mud. by again greater distance from

also. by with 5/1000 needle

Run # 11

Feb 25. d 1915

Sub marine K. 3

Reed of Bell used while boat  
is submerged

Distance away about 30 feet  
taken while submerged 25 feet

Speed of boat about 6 knots

Speed of machine 70'

Large horn used in recording

40/1000 needle used in recording.

# 12  
General assortment  
of waves &  
maximum about

8 waves to one  
area of micro

Strong - less  
Strong than  
Dried on Sub

2-26-18

Record # 12 Sub. Chart. # 152  
Taken about 12 feet from engine

Large horn used.

Reverding machine speed 75

Speed of Boat 15 knots

3 Engines running full speed

40,000 needle used

100 threads to inch

(Mr. E. remarks on opposite page)

General assortment of waves  
maximum about 8 waves to 1  
area of microscope

Strong but not so strong as  
Diesel engine on Sub marine

13  
Not much  
difference in  
volume between  
this 12 ft +  
30 ft

2-26-15

Record #13 Sub. Glass # 152  
Taken about 12 feet from engine

Large horn used  
Recording machine speed 75  
Speed of Boat 15 knots  
2 engines running full speed  
40/100 needle used  
100 threads to inch

Opposite page 113 to Large  
Not much difference in volume  
between this 12 feet away  
and 30 feet away

14

Very much  
weaker,

Think the strength  
increases faster  
than directly  
as to the number  
of Engines

2-26-18

Record #14 Sub-chaser #152

taken about 12 feet from Engines

Large horn used

Recording machine speed 75-

Speed of boat 15 knots

1 engine running full speed

#91000 needle used

100 threads to inch

Opposite page. W. E. says

Very much weaker.

Think the strength increased  
faster than directly as to  
the number of Engines

# 15

Strength a little  
more than

1. Engine running  
about 6 waves  
to one area of  
micro -

2-26-18

Record #15 Sub. chase #152

taken about 12 feet from engine

Large horn used

Recording machine speed 75-

Boat standing still

Auxiliary engine and compressor  
running

40000 needles used

100 strands to inch

On opposite page Mr E. says

Strength a little more than  
1 engine running, about  
6 waves to one area of  
microscope

16

About  $2\frac{1}{3}$   
or strength of  
15-

about  $4\frac{1}{2}$  @  
5 waves  
in area

2-26-18

Record #16

Sub. chart #152

Taken about 12 feet away from trigger

Large horn used

Recording machine speed 75

Boat standing still

(Compass) does for  
rotary

Auxiliary engine, running alone

25/1000 needle used  
100 threads to inch

Mrs E. says on opposite page

About  $\frac{1}{3}$  or strength of #15

About  $4\frac{1}{2}$  to 5 waves in  
area of microscope

17

Not quite so  
strong as full  
speed.  
Seems to have  
about same wave  
in area which  
is strange —

2-26-18

Record # 17      Sub. chart #

Record taken about 12 feet from engine

Large horn used  
Rebraking machine speed 15  
Boat running about 8 knots  
3 engines running  $\frac{1}{2}$  speed

40,000 needle used  
100 strands to inch

M. E. says on opposite page

Not quite so strong as full  
speed

Seems to have about same  
waves in area, which is  
strange

18  
About same  
strength as  
full speed &  
as many feet  
more waves  
per area than  
full speed

2-26-18

Record # 18

Sub-class # 132

Record taken about 12 feet from the  
engines

Large horn used  
Speed of recording machine 75  
Speed of boat about 8 knots  
2 engines running half speed

40/100 needle used  
100 threads to inch

Mr E. says on opposite page

About same strength as full  
speed and as many if not  
more waves per area than  
full speed.

19-

Seems stronger  
than when full  
speed +  
more waves  
per area -

2-26-18

Record #19

Sub-class #152

Record taken about 12 feet from engine

Large horn used  
Speed of recording machine 75  
Engine running  $\frac{1}{2}$  speed

#4/1000 needle used  
100 threads to inch

---

Mr E. says on opposite page

Seems stronger than when full  
and more waves per area

20 -

Seems to be  
about  $3/4$  of  
strength of  
same test at  
12 ft

2-26-18

Record #20

Sub. Blower #152

Record made about 27 feet from engine

Large horn used

Speed of recording machine 75

Speed of boat about 15 knots

3 Engines running full speed

$10/1000$  needle used

100 threads to the inch

---

Mr. E. Sayson opposite page

Seems to be about  $3/4$  of  
strength of same test at  
12 feet

21

Considerable  
weaker than  
at 12 ft

2-26-18

Record #21

Sub, class #152

Record made about 27 feet from engines

Large horn used

Speed of recording machine 75

2 engines running full speed

40,000 needle used

100 threads to the inch

---

W. E. says on opposite page

considerable weaker than  
at 12 feet

22

A little <sup>less</sup> than at 12 ft

2-26-18

Record # 22

Sub. class # 152

Record made, about 27 feet from engine

Large horn used  
Speed of recording machine 75

1 engine running full speed

44/1000 needle used  
100 strands to inch

AM & says on opposite page

is little more than at 12 feet

23

$\frac{3}{4}$  strength  
of full speed

2-26-18

Record #23

Sub-chaser #152

Record made about 27 feet from engine

Large horn used

Speed of recording machine 75

Speed of boat about 17 to 5  
knots

3 engines running half speed

49/1000 needle used

100 threads to the inch

---

Mr E. says in opposite page

$\frac{3}{4}$  strength of full speed

2-26-18

Record #24 Sub-chased #152

Record made about 27 feet from engines

Large horn used

Speed of recording machine 75

2 Engines running half speed

40/000 needle used

100 threads to the inch

2-26-18

Record # 25 Sub. chase # 152

Record made about 27 feet from engine

Large bone used

Speed of recording machine 75

1 Engine running half speed

44000 needle used

100 strokes to the inch

2-26-18

Record 26

Sub class #752

Record made about 27 feet from engine

Large horn used

Speed of recording machine 75

Auxiliary engine running alone

Boat standing still

40/1000 needle used

110 threads to the inch

2-26-18

Record #27 Sub chaser #152

Record taken about 27 feet from engine

Large horn used  
Speed of recording machine 75'

auxiliary engine and compressor  
running

Boat standing still

40/1000 needle used  
100 threads to the inch

28

Scarcely can  
see it

2-26-18

Record 28 Sub-chaser #152

Record made in Bow of Boat  
about 35 feet from engines  
and behind Pilot room

Speed of Recording machine 75'

3 Engines running full speed

Boat speed about 15 knots

14/1000 needle used

100 threads to the inch

---

MV E. Saylor opposite page

Scarcely can see it

2-26-18

Record #29 Sub Chaser #152

Read made in Bow of boat about  
35 feet from engines and back of  
Pilot room

Speed of recording machine 75

3 Engines running full speed

Speed of boat about 15 knots

7/1000 needle used  
200 strands to inch.

DEPARTMENT OF COMMERCE

# 30

Main Vibration

1 to 8 tenths area

Many Vibration

Something like

Submarine running  
full speed on

Diesel

about 18 Vibs  
per area  
all over

70, 283  
Ed. 6 (2-11-1900,000)

2-27-18

Record # 90

Sea Plane # 435

Record taken in open air about  
40 feet from shoreline

Large loud sound

Speed of recording machine 75

4/1000 scale used

100 attempts to run and

Plane standing still engines  
running full speed

Mr E. says on opposite page.

Main vibrations 1 to 8 tenths area  
many vibrations something like  
submarine running full speed  
on Diesel, about 18 vibrations  
altogether.

DEPARTMENT OF COMMERCE

31

Very Much

weaker

3 times or more

weaker

No. 283  
Ed. 6-29-18-1,000,000

2-27-18

Record #31

Sea Plane #35

Record taken about 40 feet from machine

Large horse used  
Speed of recording machine 15  
40,000 needle used  
100 threads to the inch

Plane standing still  
Engines running half speed.

on E. snap on opposite page

Very much weaker  
3 times or more weaker.

DEPARTMENT OF COMMERCE

32

Where used  
quested. Very strong  
10 a.m. 25  
all together in  
area - big & little  
at start

Dies away very  
rapidly - nothing

No. 211  
S.A. 2-12-190,000

2-27-18

Record # 32

Sea plane #435

Start of record made about 40 feet  
from machine

Large horn used

Speed of recording machine 15

4,000 miles used

100 vibrations to the inch

Plane starting and going out  
gradually.

Mr. E says on opposite page

When sound given out very strong  
ward 25' altogether in time  
big and little at start

Dies away very rapidly - got  
nothing.

DEPARTMENT OF COMMERCE

33

Just see it when  
150 ft or closer  
little another  
extremely faint

No. 223  
D.L. 6-27-11-1,000,000

(33)  
the E. says above  
just see it when 150 feet  
overhead

little another  
extremely faint

2-27-18

Record # 33 Sea Plane # 435  
1st Part of record.  
Plane coming in and stopping  
about 40 feet away  
When I started to record I should  
judge the Plane to be 150 feet  
away.

Wind was blowing in my face.

2nd part  
Plane passing over head about  
150 feet in air  
Passed very rapidly

3rd part  
Plane landing and coming  
to stop.  
Plane about 45 feet away  
when stopped  
Plane about 100 to 125 feet  
away when I first started to  
record and on the water.

3-4-18

Record # 32

See Plane 32

Start of record made about 120 feet from Plane and I continued to follow Plane trying to record until it had reached a distance of about 300 feet.

Large horn used  
Speed of recording machine  
175 R.P.M.  
19/1000 needle used  
100 threads to the inch

Plane starting and going away

3-4-15

Record #35

See time 500.

Start of record made about 65 ft  
from plane and I continued  
to follow plane trying to get  
rec'd until plane arose from  
the water, about 300 feet away

Large horn used  
Speed of recording machine 75  
44/000 needle used  
100 threads to the inch

Plane starting and going away.

36 —

~~Remarks~~

Its faint but  
quite distinct  
Could hear this  
I think at 1000  
yds of noise  
only little,

9-6-18

Record # 36 Sub Marine K. 3

Motor operating diving rudder

Record taken about 12 feet from  
motor

1st trial cut very light

2nd trial cut deep.

These noise occurs intermittently  
operated by wheel.

Large horn used  
Speed of recording machine 75  
No. 000 needle used  
100 threads to inch

Motor 1 Horse Power 450 R.P.M.

37

Very much  
2 Changer -

3-6-18

Record #37

Submarine N. 3

Motor operating diving machine  
Record taken about 8 feet from the  
motor

1st trial - cut light  
2nd. " " lighter still  
3rd " " deeper

These noises occur intermittently  
operated by air hose

Large horn used  
Speed of recording machine 75-  
40/1000 needle biased  
100 threads to the inch

Motor 1 horse power 450 T.P.H.

38-

Quite strong  
stronger than

37 - don't  
think be any  
trouble 1000  
yds on this

3-6-18

Record #38

Sub marine K3

Motor operating steering rollers

2 H.P. 450 RPM

Record taken about 12 feet from  
motor

1st trial, cut light

2nd " " deeper

These noises also occur, intermittently  
operated by critical

Large line used

Speed of reeling machine 75-

4000 yards a wheel

100 threads to the inch

39 -

faint but  
read -

3-6-18

Record # 39

Sub-marine K. 3

This record has both the diving and  
steering motor noises on it  
taken in Forward Battery department  
about 25 ft away.

1st Part Diving motor (25 ft away)

1st trial, cut deep

2nd " " lighter

— " — " 1 H.P. 450 R.P.M.

2 Part Steering motor (25 ft away)

1st trial, cut lighter

2nd " " little deeper

3rd " " still deeper

Notes records intermittent

Large horn used

Speed of machine 75

40/1000 needle used

100 threads to inch

2 H.P. 450 R.P.M.

longer  
than Shuang  
Kudda. He  
should hear  
this song at  
1000 yds of  
distance.

Record # 40      Luk-murine K. 3

Motor Generators for Lighthouse Lamp  
Spind 2250

Also voltage regulator for above  
Board turned about 12 ft away

Second part of work trail to the  
voltage regulator which is the  
earliest place the Boulder

3 cuts, Tanned

101 deep

2nd. Liquid

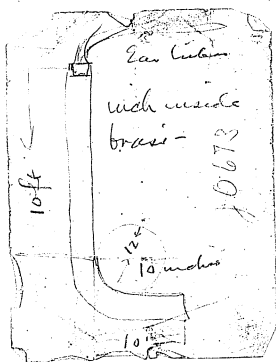
3rd deeper than 2nd cut

Large horn wood

Filed according to date 75

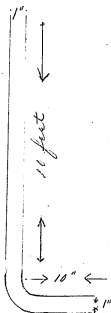
10/1000 Needle Thread

100 thread to the inch



March 7th 1918 ①

At Mr E. instructions had a brass tube following dimensions made



Bend to radius 12"

March 8<sup>th</sup> 1918

Tried tube submerged in water  
4 feet in water and 1 foot  
in air.

Heard boats passing about 300 feet  
away but sound was very weak  
and somewhat metallic.

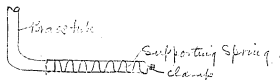
Tried tube at different depths and  
found that when I pulled nearer  
the surface sound became weaker.

March 9<sup>th</sup>

Went out to long dock near forts  
and tested with Morris bell. With  
I could only get about 150 feet  
away. I then put a rubber  
diaphragm over mouth of tube  
submerged and found sound  
much better. In fact could  
get bell about 250 feet away.  
I also could get boats of  
all sizes 250 yards or 750 to  
800 feet away.

March 11<sup>th</sup>

Had devices made up to attach to lower  
end of tube as follows. Each consisted  
of a rubber tubing supported on a  
brass spring, and closed at the outer  
end.



These Rubber ends were of following dimensions

|    |          |                          |
|----|----------|--------------------------|
| #1 | 12" long | - circular cross-section |
| #2 | 9" "     | - " "                    |
| #3 | 6" "     | - " "                    |
| #4 | 3" "     | - " "                    |
| #5 | 6" "     | - elliptical "           |
| #6 | 12" "    | - square "               |

Results,

March 14<sup>th</sup>

With 12" circular can hear Morris Bell  
at distance of about 425 feet.

Same for 9" circular

for 6" circular from 400 to 425 feet.

4

With 3" circular - same (700 to 425 ft)

The results with the elliptical and square cross section tubes were the same as above.

Therefore, the shape of the tube seems to make no difference.

The sound heard seems louder when the end of the tube is pointing toward the source.

In order for this scheme to work, for all water must be kept out of the tube. As soon as water enters the tube, the usefulness is destroyed - the device seems to go dead.

Must get some new device for supporting rubber tubes. Schemes -

- (1) Still tube full of holes
- (2) Support rubber on rods run longitudinally.

Partly  
Huges & Evans

5

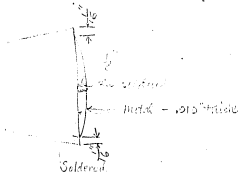
Dec. 15, 1912.

Experiment with rubber tubes. By Huges & Evans.

Attach horn -  $2\frac{1}{2}$ " opening about 2 ft long  
to end of Standing Tube

1st - attach rubber diaphragm around  
horn - get electrical.

2nd - try electric shock for discharge



Then first direction of hearing bell in air taking into account direction of the wind.

Only on Day 18 June.  
March 16<sup>th</sup>

Tried horn fitted with rubber diaphragm over mouth, as under "1st" on preceding page.

Results - greatest distance at which Moore's bell could be heard - 425 feet.

Then tried same outfit except that on diaphragm we had mounted the metal domed device as under "2nd" on preceding page.

Results for distance same as before (425 feet).

With this device, the tone heard was more metallic than with the plain diaphragm. The real sound of the bell could be heard with greater sharpness than when this additional device was not used.

Just as we had completed the tests and Mr. Hayes was listening to a boat in the channel the diaphragm broke.

Tests in air for effect of wind.

Method of tests Pointing the horn with the mouth toward the bell, we gradually moved the bell away from the horn until the sound from the bell could no longer be heard. The directions in which the bell was moved were as follows.

1 - into the wind, that is so that the wind blew from the source of sound to the horn

2 - in the direction of the wind, — so that the sound travelled from source to sound against the wind.

3 - at right angles to direction of wind to left of observer.

4 - at right angles to direction of wind to right of observer.

#### Results

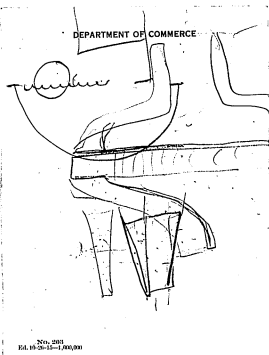
For 1 (sound travelling with the wind) the sound of the bell was lost at a distance of 88 feet.  
 2 (sound against the wind) sound lost at distance of 75 feet.

3 and 4 Results the same — distance 80 feet.

#### Additional tests.

We listened to the bell, to the exhaust of the engines in the Electric Power House on the main land, and to the noise of an aeroplane. We pointed the mouth of the horn <sup>(1)</sup> toward the source (2) at right angles to the line between source and horn (3) directly away from source.

Results. There seemed to be very little difference in the intensity of the sounds heard for these three positions of the horn. With the horn pointing



toward the source, the sound was most intense but, to repeat, there is very little difference in the intensity of the sound heard for a revolution of the horn through a complete circle.

Patty Hayes & Dr. Evans.

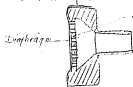
Mar. 17, 1918

Experiments given by Mr. E.

- 1 - Try large diaphragm - don't go too deep.
- 2 - Try diaphragm on tube alone and then put horn on same as in air recording.  
Large diaphragm Peak 450 feet  
submerged 2 feet 6 inches

Also.

- 3 - Try rubber diaphragm mounted on backing.  
The backing to consist of a perforated sheet of metal.  
sheet, perforation



187 holes  $\frac{1}{16}$  diameter  
Plate  $\frac{1}{16}$  diameter

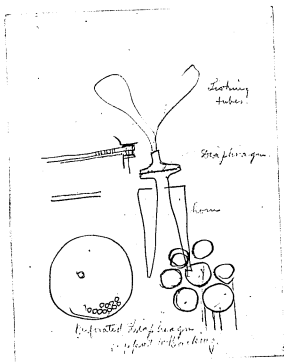
$$\frac{\text{Total area of all holes}}{\text{area of plate}} = 51.8\%$$

Results:-

Distance Morris bell can be heard 550 feet.

Putting diaphragm closer into the water seems to increase the sensitiveness of the instrument. Thus at 550 feet with diaphragm 18" under surface the bell was not heard, submerging to about 4 feet the bell could

12



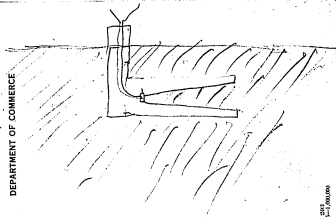
13

be marked the distance say 250 mils.

4- Try horn with short pipe and get entering tubercles to the center of pipe.

14

DEPARTMENT OF COMMERCE


 100-100-100-100  
 100-100-100-100

15

5(A) Surround the stem and all of the connecting tube under water with an air chamber.

Distance from bell can't stand 150 ft. Sound of bell reaching the water surface, being a 1/2 mile to the surface, the sound is heard.

How long it takes the sound to travel 2 1/2 miles long. 1 "small" air chamber, being 1/2 mile to the surface from the "small" air chamber 7000



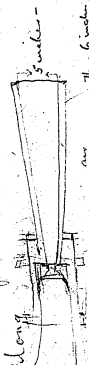
5(B) Pump out air in chamber of water there having a vacuum in the water and inside pipe. Vacuum 20 inches

Don't know if the air in space between the outside piping and the inner pipe.

16

Haves -

Double funnel should be 60 inches



Double clip to funnel

Thin sheets goes up 1250 ft

Make sure they were informed they

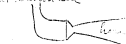
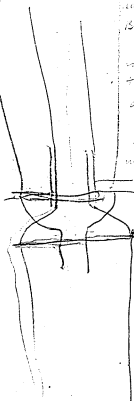
17

16- Have definition first in drawing on opposite page (page 17) in order.

Thin apparatus where  
vertical than sheets be in  
Both could be used only if left

Prove that the same  
is not there the really  
the board, look out in  
directions

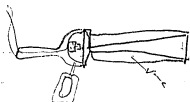
No answer would be  
pattern with this answering  
most common here



Thin first set sheet in  
pattern of thick  
arrangement



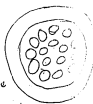
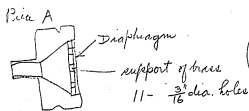
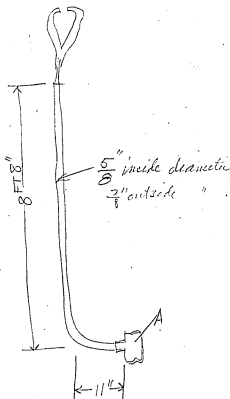
18

705, 012  
Feb. 10, 1914

DEPARTMENT OF COMMERCE

19

I Have proposed a method of communication consisting of a transmitter equipped with a horn that for distance is the principle of distance to find the best point to place the horn.



March 21, 1914

Used out rubber line and put in double  
walled apparatus. Resulted in going to line  
not pumped out.

Result could hear Murph's Bell at a distance  
of 450 feet.

Diaphragm about 3 feet below surface.

Also tried out apparatus shown on opposite  
page.

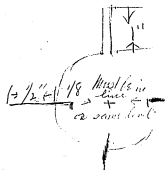
Diaphragm used — a stretched piece of  
stretched down rubber. An apparatus made of  
thicker, heavier material seems to give better  
results than one made of light material, such as  
galvanized iron or tin. Sheet made from heavier  
material is quieter and therefore more better  
than one of lighter material.

Distance 1000 feet by hand = 650 feet.

No horn used. Diaphragm submerged 3 feet.  
The result — hearing distance — that of 1000 feet = 71%.

It seems to us that an apparatus of this nature  
built from heavy material, that is, with  
all of greater thickness, will give better  
results.

Very Truly Yours  
H. H. H. H.



1 7/16

Stick 3/32



Contacts  
curved in  
Copper if  
possible

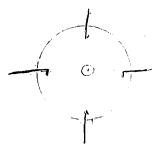
Shape of contacts all  
4 on sides. points down &  
bottom contact straight

Et

A. Garbo da  
U.S.S. K. 3  
c/o Post master  
New York

for Packages.

C.D. Payne.



11/12

$$(m^2+1)x^2 - 2Ax + A^2 - R^2 = 0$$

$$x = \frac{2A \pm \sqrt{4A^2 - 4(m^2+1)(A^2 - R^2)}}{2(m^2+1)}$$

$$x = \frac{A \pm \sqrt{A^2 - (m^2+1)(A^2 - R^2)}}{m^2+1}$$

Solve for y:

$$x = \frac{1}{m}y$$

Subst in eqn. (2)

$$\left(\frac{y}{m} - \cos x\right)^2 + y^2 = r^2$$

$$\left(\frac{y}{m} - A\right)^2 + y^2 - R^2 = 0$$

$$\frac{y^2}{m^2} - \frac{2Ay}{m} + A^2 + y^2 - R^2 = 0$$

$$(m^2+1)y^2 - 2Ay + A^2 - R^2 = 0$$

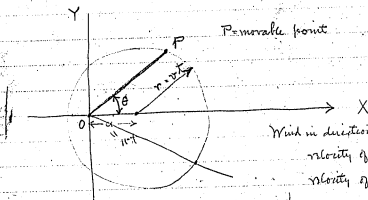
$$y = \frac{2A \pm \sqrt{4A^2 - 4(m^2+1)(A^2 - R^2)}}{2(m^2+1)}$$

$$(m^2+1)y^2 - 2Ay + m^2(A^2 - R^2) = 0$$

$$y = \frac{2A \pm \sqrt{4A^2 - 4(m^2+1)m^2(A^2 - R^2)}}{2(m^2+1)}$$

$$= \frac{m \{ A \pm \sqrt{A^2 - (m^2+1)(A^2 - R^2)} \}}{(m^2+1)}$$

y = mx



P movable point

Wind in direction of X.

velocity of wind =  $w$  feet per sec.

velocity of sound =  $v$  feet per sec.

$$(1) \quad (x-a)^2 + y^2 = r^2$$

$$a = wt$$

$$r = vt$$

$$(2) \quad (x-wt)^2 + y^2 = v^2 t^2$$

Circle P - equipotential line for sound intensity

$$(3) \quad \text{Eqn. line OP} \quad y = mx \quad m = \tan \theta$$

Substitute (3) in (2)

$$(x-wt)^2 + m^2 x^2 = v^2 t^2$$

Now consider particular equipotential line where  $wt$  and  $v^2 t^2$  become constants. say  $A$  &  $R$ . [ $R$  = radius]

$$(x-A)^2 + m^2 x^2 = R^2$$

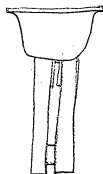
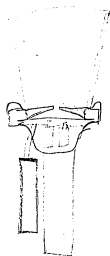
$$x^2 - 2Ax + A^2 + m^2 x^2 - R^2 = 0$$

$$A = wt \quad \text{Wind}$$

$$R = vt \quad \text{Sound}$$







**Notebook Series -- Notebooks by Edison and Other Experimenters  
Group 5: Battery Experiments (1914-1919)**

These seven notebooks were used primarily from 1914 to 1916, although one book was used as late as 1919. The majority of the entries are by Harold H. Smith. The books contain data on battery cell tests performed at Edison's request. Some notes indicate an experiment number, a tube number, and different preparations of iron or electrolyte. There are a few comments by Edison and other evidence of his oversight, including mention of Edison as the person who "cuts out" the cells being tested. Also included are experiments relating to efforts to regenerate used storage battery components, such as pockets or tubes. Much of the work in these books is summarized, tabulated, or described in N-14-04-26 and N-14-12-03, Notebooks by Edison.

The one selected book contains several notes by Edison with no clear summary in his own notebooks.

N-Number

Label or Inscription on Front Cover or Flyleaf

**Selected Book**

14-06-02

---

**Books Not Selected**

14-05-16.1

"TAE Experiments HHS Notes"

14-11-28

"T.A.E. Experiments Index 1914"

15-01-11.1

"TAE Experiments Index -1914-"

14-12-14.1

"TAE Reports I 142E-381E"

14-12-14.2

"TAE Reports II 385E-892E"

19-02-15.1

"T.A.E. Reports III"

**Notebook Series -- Notebooks by Edison and Other Experimenters  
Battery Experiments  
Notebook, N-14-06-02**

This non-standard notebook, which covers the period May-October 1914, consists of approximately 70 pages of loose notes that were at one time fastened together. Most of the notes are by Edison and Harold H. Smith, chief of the Battery Research Department. There are also notes by James F. Monahan, superintendent of the Edison Storage Battery Co., and by employees Harry C. Leonard and Robert Saville. The material relates primarily to experiments aimed at the rejuvenation or regeneration of used battery components. These experiments were performed under Edison's direction on iron from old negative electrode "pockets." The pockets were often reconstructed with treated iron. The experiments are related to the work in N-14-04-26 and N-14-12-03, Notebooks by Edison.

Approximately 70 percent of the book has been selected. The selected material pertains to the experiments (identified by "TAE" numbers) performed under the direction of Edison. The unrelated tests at the beginning of the book (identified by "Silver Lake" numbers) have not been selected.

6/22/14

N.C.

Put following 2 Experiments on

Lat test

TAE No. 156

1902

1902 A

1902

1902 A

232 - 238 inc.

J.H. Swift

6/26/14

U/C

Get out the following 7  
experiments

158.25

153

157

162

165

166

168

156A

212-230 inclusive

158.25

The Experiment

6/27/10

No. 239

|         |         |           |
|---------|---------|-----------|
| 1st run | 3rd run | 1030-990  |
| 2nd "   | "       | 1320-2075 |
| 3rd "   | "       | 1515-2100 |

Ex Experiment

6/29/14.

No. 239

4th run

1475 - 2245

Will assemble 1st cell  
with new Tin Cell examined  
but appears O.K.

Record of 239 continued on  
large sheet.

6/29/14.

H.C.

Assemble to Exp. 189 (J.G.E.  
No. 239) with new his. It's  
running very much lower than its  
mate.

W.H.

Run these pockets  
several times mark  
Mr. Edison - accounts

348 E

July 25-1914



You asked us put  
some for that run low, on 10  
hot runs. We have done  
this with 4 pockets of this 2972

Before hot runs

At 750 ma. 1300-1187-1000-1000

" 400 " 1833-1700-1687-1707

Hot capacity (450 ma) 1300-1185-1190-1150

After hot runs

At 750 ma. 775-650-987-462

" 400 " 1255-1870-1270-560

We are holding these pockets  
in case you want them for  
examination or other purpose.

Smith

Smith

Wake up right away

(2) 4 pockets of 2972 Mix Fe  
with Otts No 4 die

don't Corrugate

439<sup>8</sup> 130-148  
1140<sup>8</sup> 149-148

(2) Also 4 with Otts

No 2 Die -

417<sup>8</sup> 137 136  
438<sup>8</sup> 138 137

Smith -

Please answer  
inquiry about that batch  
of <sup>red</sup> iron that gave the bad  
results sent today =

Also send me over

For H Oungis -

Feb. 29/2

7/27/14.

Mr. Edison -

The No. 2972 has  
been used in regular calls.  
I have handed your note to  
Mr. Buchanan for attention and  
per your request.

Min. all used up except  
I was able to get 6 packets  
for use with Fred C. C. C.  
you called for 4 each - can  
only make 2 each.

Cannot get the sample  
you want. Will be over  
soon to see you about it.

Smith

347 E

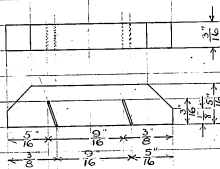
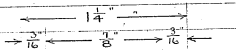


is the pressure  
device pocket



8/12/15.

Special Hard Rubber Amulators



8 wanted

Scale - Double size.

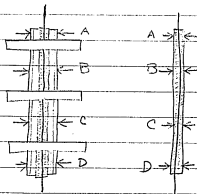
Please rush!

ask with.

cut

347 E

Pocket 449 E in frame  
 " 450 E rest in frame



Calipers

| Before Test | 449 E | 450 E |
|-------------|-------|-------|
| A           | .3650 | .1215 |
| B           | .3620 | .1195 |
| C           | .3617 | .1217 |
| D           | .3645 | .1235 |

#348E

002-6161  
1997-2000  
Shelby

Iron Mine 2972

8/7/12

7507102

|               | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    |
|---------------|------|------|------|------|------|------|------|------|
| Regular       | 2333 | 1967 | 1753 | 1037 | 1087 | 1000 | 1713 | 1687 |
| "             | 2000 | 2000 | 1933 | 1100 | 1187 | 1000 | 1680 | 1707 |
| "             | 2001 | 2033 | 1967 | 1873 | 1037 | 1000 | 1027 | 1813 |
| "             | 2002 | 2380 | 1780 | 1687 | 900  | 837  | 850  | 1680 |
| Off No. 2 Die | 437  | 2887 | 2193 | 2277 | 1412 | 1400 | 1037 | 2253 |
| "             | 438  | 2880 | 2207 | 2320 | 1500 | 1500 | 1600 | 2387 |
| Off No. 1 Die | 439  | 2893 | 2393 | 2437 | 1600 | 1680 | 1637 | 2487 |
| "             | 440  | 2620 | 2000 | 2093 | 1725 | 1775 | 1837 | 2747 |

8/8/42

Received memo from H.E.  
asking if any pressure used before  
Otto die. Replied no but of course  
slight pressure on pocket with no. 2  
die.

2049107

~~Account~~

Smith -

Take 343E + 344E

+ Run them ~~say~~ same as you  
run Reg wrens 3 at normal

3 at 750 rate, <sup>as</sup> + then keep

on running <sup>at normal</sup> till I tell you

to put on hat -

Σ

2049107

Aug. 10, 1912

Experiments

Mr. Edson -

I note per your  
memo. that you want 343E  
and 344E on regular Fe  
schedule, that is,

3 at normal rate

3 " 750 "

Now normal until you  
order them on lot.

They have already had  
7 normal ones so I am  
putting them on at 750 now.

Smith

200-113

Smith

Have you received

345 E 346 E from  
McClair —

|   | <u>345</u>    | <u>346</u> |
|---|---------------|------------|
| 1 | 65-50         | 75-100     |
| 2 | less than 300 | 260-820    |
| 3 | 730-690       | 230-915    |

211

Aug 25/14

Mr. M. Shaw.

Enclosed are 4 specimens of  
 for analysis of S. H. C. & S. H. C. & S. H. C.  
 that have negative plate, found  
 with no plate.

To Miss #3011 and to the chief

will give me satisfaction. Another

is probably around 1000 and 1000

capacity being about 1500 M-H-H.

Best at

|       | 1. Volt | 5 Volt | 1 Volt | 5 Volt |
|-------|---------|--------|--------|--------|
| Sp 62 | 201.5   | 206.5  | 173    | 182.7  |
| Sp 63 | 202     | 207.5  | 173.5  | 183    |

Research Dept.

Seville

Results of Chase test

should be sent to M. Z. as

Mr. Edison values all others.



Calls "62" - "63" were accompanied by the  
negative. Pressed with our div. - completed.  
The electrical results amount to ~~as~~ as  
those obtained on single test. And  
think that this is due to some  
I could not pressure from the Chemical Dept.  
enough of the same mass as we made  
on "our" single test packets. And  
find that our "3011" which calls "62" - "63"  
contain did not run over 1500 M. A. H.  
packet loaded at Silver Lake.

We have two cells of "3011" div. pressed  
in regular way - completed div. on test  
will send you this report when complete.

Respect,

Monahan

For. Misc. # 11

Aug 31st

Oct. 1st (4)

|       | Cell 50502 | Cell 50502 | Cell 50503 | Cell 50503 |
|-------|------------|------------|------------|------------|
|       | 1 Volt     | 5 Volt     | 1 Volt     | 5 Volt     |
| Run 1 | 201.5      | 206.5      | 202        | 207.5      |
| Run 2 | 172        | 182.7      | 173.5      | 183        |

Reg. 1st. Computed Due

|       | Cell 9210.B | Cell 9210.B | Cell 9211.B | Cell 9211.B |
|-------|-------------|-------------|-------------|-------------|
|       | 1 Volt      | 5 Volt      | 1 Volt      | 5 Volt      |
| Run 1 | 211.5       | 220         | 209         | 216         |
| Run 2 | 185         | 196.5       | 187.5       | 193.7       |

Sanville

11/11

Aug 31, 1914.

| Run | 1 Volt | 2 Volt | 3 Volt | 4 Volt |
|-----|--------|--------|--------|--------|
| B   | 181.5  | 184    | 187.5  | 192.2  |
| " 4 | 178    | 176.2  | 175    | 172.5  |
| " 5 | 168.7  | 171.2  | 169.2  | 172.2  |
| " 6 | 159    |        | 159    |        |
| " 7 | 170    |        | 169.2  |        |
| " 8 | 169.5  |        | 168.5  |        |
| " 9 | 164.5  |        | 170.5  |        |

Spencer Fe Mine #2106. (47. Hg)

|       | 1 Volt | 2 Volt | 3 Volt | 4 Volt |
|-------|--------|--------|--------|--------|
| Run 3 | 174    | 181    | 176    | 182.5  |
| " 4   | 166.2  | 173.7  | 167.5  | 173.7  |
| " 5   | 165    | 174    | 165    | 174    |
| " 6   | 155    |        | 157.5  |        |
| " 7   | 166.2  |        | 166.2  |        |
| " 8   | 163.5  |        | 165    |        |
| " 9   | 157.5  |        | 160    |        |
| "     |        |        |        |        |
| "     |        |        |        |        |

253

Wheeler  
Horn 2109  
Wheeler 2106

Sept 1st. 1914.

Smith

Mark these cells  
with my number

Special Ye. 9 min #2109

" " " 2106

Reported yesterday up to date.

Ye. 9 min #3011

(Off die (#4.)

Sp. #62

RUN 3

" #63

" "

1 Volt .5 Volt

165 178

161.5 177.5

Reg. Corrugated Die

1 Volt .5 Volt

9210 B. RUN 3

9211 B.

"

172.5 183

170 181.2

Savich

9/3/12

R/C

Until further notice remain  
In Expts 2A E. 2m 335-336 E  
at 35° N. Otherwise normal  
stats.

Single B Fe plate  
from J. F. M.



333. Ex

✓ Press 2 B+ Plates with Ott #4 Die

334. Ex

✓ Press 2 B+ with old convex die  
first then crimp with Ott #4  
die

335. Ex

2 B+ Plates with Ott #4 die first,  
then press with flat die

336. Ex

✓ Press 2 Plates in Ott #4 then  
corrugated in old regular comping  
die

Above is copy of Mr. Edison's note  
to Fred Ott or Morahan.

223

Fred Ott =

Make 6-pockets, 7 grams  
Each irregular iron mix #3636  
with yoffer #4 die + afterwards  
press with flat die -

Tell Smith to use 2.  
+ give first 5 runs hot at  
130 Fahr & then run normal  
+ number these 2 - #362 E

The other 2 pockets are to  
be run 1st 5 Runs cold  
35° Fahr & then run normal  
& marked 363 E

The 3rd 2 are to be  
run 5 runs at ~~normal~~  
ordinary temperature but  
at 800 rate then run  
normal - Mark 365E



Je.

Smith-



Discharge the two X0333 P  
to Zero + send Cells to

Fred Ott =

Pockets cut away here by Fred  
Ott & Cells put in regular  
man.

Mondan

~~How~~ How you

getting on with B type  
cramping die for  
Iron

Expect to finish this die  
on Monday or Tuesday  
Edison

Have you finished the  
A4's for Endurance  
test with new die

Report on this sent  
Wagon on Tues  
m

Mr. Edison

Please send me your accounting  
numbers for the following, that

Mamah

366 1/2

6- A-4 Cells

7-gave Pocket

Pressure 160 Lbs New Comp. Dig. <sup>over</sup>

Pressure with Flat die 120 Lbs

Cells needed to distribute Lithium

No. Sp 72 to Sp 77

B-4 Cells

367 1/2

6- B-4 cells

5.3

gave Pocket

Pressure 80 Lbs New Comp. Dig. <sup>over</sup>

" Flat Die 60 Lbs

Cells needed to distribute Lithium

Flat

Cell

High rate

7/20/1911

247 1/2

Further tests.

366 E (after 10 runs (last note 477))

60 Amp. Dia. to 9 Y.

90 " " " 8 Y.

Cold at 30, 40 and 50 Amps.

367 E

7.5 Amp changing -

9/2/10.

WC

708 343E - 344E

Rechts 441-2-3-4. Pt

in coll. tent at 708 ft.

441E

9-22-14

The Expts.

366 E

Run 2

6 Q 4 Cells

1.4 Volt

1.5 Volt

173

- 178.5

} at normal

175.5

- 177.5

} Int.

Run 1 in  
in J.C.

154

- 157

} at 130° F.

156

- 159

70

- 113

} at 35° F.

75

- 1.4

|   |      |      |    |
|---|------|------|----|
| 1 | 1200 | 1200 | 10 |
|---|------|------|----|

| 366 E          | Run 1.      | 6 Au Ccs.   |
|----------------|-------------|-------------|
|                | <u>1.V.</u> | <u>.5V.</u> |
| Cells revolved | 225         | 231         |
| to distribute  | 225.5       | 233.5       |
| Li OH          | 225         | 232         |
| Crystals       | 225         | 231.7       |
|                | 225         | 234         |
|                | 226.5       | 235         |

Beginning with 2nd run these cells  
will run as follows:

|         |                       |
|---------|-----------------------|
| 1st two | at normal temperature |
| 2nd "   | " 150° F.             |
| 3rd "   | " 350° F.             |

6123

Smith =

This dont look  
right, & 2nd Run  
Proves it apparently

Σ

Mark these 6 Cells  
366A 366B 366C 366D  
366E 366F

See reply on  
large sheet report  
for 9/25/44  
C.S.

Fe

378E 7 gram packets 2 at  
300 atmos pressure  
CH #5 die

379E 7 gram Cakes 2 at 200  
atmosphere  
CH #5 die

380E 4 gram pkts. 2 at 125  
atmosphere  
CH #5 die

River Raq

9/28/44.

TAE # 240 A4 Cells ED-SP-A and ED-SP-B

" 351 " Cell # 25431

" 353 " Cells Sp 62 and Sp 63

" 354 " " 9210 B and 9211 B

Run all of the above cells as follows

3 runs, charge at 100 amp from 30 amp to 100 amp to .5V.  
Then 5 " Overcharges  $\rightarrow$  normal rate discharges  
at 120° F.

TAE # 333X B-Je 1008-1009

" 334X " 1006-1007

" 335X " 1012-1013

" 336X " 1010-1011

Since these 3 runs charging normally  
and discharging at 7.5 amp to .5V.

TAE # 352 B4 Cells Sp 64 and Sp 65

" 355 " " Sp 68 " Sp 69

3 runs <sup>over</sup> normal charge discharges 30 amp to .5V. (155)

9/30/4.

A.C.

ME # 358 Au cell Sp 70-71.

Charge 12 hours 30 amp discharge  
at 100 amp to 0.5 volt per cell.

SAE # 370 Au cell Sp 48-49.

Run at normal rates and 12 hour  
charges at 35° Fahr.

W.H.S.

Smith

370 E

Put the Cells A &  
without any Nickel plating  
on Cold test

S

10/5/14

SLC

Put new line and new solution  
with daily production for 1997 to 2000  
inclusive.

W.H.K.

10/10/14.

N.C.

Cut out JAE Exp. # 294. Tubes  
nos. E456 and E457.

JAE Exp. # 368. Tubes nos. E528-E529  
hereafter to run on regular  
shot tube schedule

JAE Exp. 349 (J<sub>2</sub>). Pockets 455 to 462  
to run at 800 ma discharge rate  
until further notice.

W.H.H.

October 1933

Smith Cut out 357E = 362E ✓  
363E

Give 359 360 361 some 130° runs  
some high rate runs 100 amp- ✓

Give some high dischg rates to 366 group  
100 amp- ✓

What is 333X 334X 335X & 336X ✓  
I cant make out what they are -

✓ Find out from anchors the loading weights  
of 372 373 374 375 376 377 ✓  
~~378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400~~

492

Smith

What are 367 group- ✓

Smith. give 343 + 344 - ✓

Some 130° Runs + some 750 rate  
runs

Stop Bismuth Cells where there ✓  
are two #2 to each Nickel + have  
Monahan give you some new Irons  
made with the new #4 die giving  
only Edge crimp - + go ahead  
again

Open up 354 + 353. I think ✓  
there has been a mix up, either  
both have wires with the new  
#4 die, or 353 is marked wrong  
put them back on test again after  
you have found out,

Inspected +  
found OK  
Add 1/2

10/14/68

H.C.

Put new Lin and new  
solution in the Exp. packets 437 to  
440 n.c. JAE # 348.

stop.

TAE Expts

343-

10/15/14

6/2/1914

110/10/14

Order given  
probably 10/10/14

21C

JAE Exp 344 Pockets 443-444

\* Give 10 hot runs 130°

Then put on regular schedule

JAE Exp 343 Pockets 441-442

Cut out

JAE 357 Pockets 449-472

362

509-510

363

511-512

Cut out

JAE 359 Av. Acc. 9367B-68B

360

F1-F2

361

F7-F8

Give 10 hot runs 130°

Then 3 normal runs

10 runs discharging at 100 Amp

Then 3 normal runs further discharge

② 10/15/14.

J.R.E. #366 Au Cells Sp. 72 - 77.

Give 10 runs at 100 Amp.

Then normal until further notice  
-J.H.S.

**Notebook Series -- Notebooks by Edison and Other Experimenters**  
**Group 6: Miscellaneous Experiments (ca. 1916, 1918)**

There are two notebooks in this group. N-Undated.4 was used, probably in 1916, for tests of musical instruments and parts. Most of the entries are by Absalom M. Kennedy, but there are also some notes by Edison. N-18-12-21 (not selected) contains lists of organic liquids, with notations by Edison regarding the solubility of lithium chloride (LiCl) and whether a "line" appears to indicate solubility. Some of the entries are probably by Ludwig F. (Louis) Ott. The results of the experiments in this book are summarized in N-18-11-26 and N-18-12-26.2, Notebooks by Edison.

N-Number

Inscription on Front Cover or Flyleaf

**Selected Book**

Undated.4

"Tests of Musical Instruments and parts"

**Book Not Selected**

18-12-21

"Li Cl Organic Liquid"

**Notebook Series -- Notebooks by Edison and Other Experimenters  
Miscellaneous Experiments  
Notebook, N-Undated.4**

This notebook was used by Edison and Absalom M. Kennedy, probably during 1916, for notes on experiments relating to violins and violin strings. The early entries (experiments 1-31) include numerous comments by Edison, particularly on the loudness of the recordings. The remaining entries (experiments 32-176) simply list the instrument or string and provide no comments; these have not been selected. The front cover is labeled "Tests of Musical Instruments and parts." The pages are unnumbered. Approximately 65 pages have been used.

Tests of Violin "E" Strings

STEEL

L.H. Damascus #54

Rox

#1

#2

#3

SILK

Rot/Silk #1042

Bot

#4. Very impure -

- #5. <sup>much</sup> louder than 4. most  
notes pure, some impure -  
high notes audible whenever  
#6. <sup>in 4</sup> ~~in 4~~ <sup>unusually</sup> ~~unusually~~ <sup>volume</sup> ~~volume~~  
not quite so loud as 5 or more notes

R. Anglon Braided Silk Rot

#7. Fairly pure - Volume variable.  
at one spot enormous. Variation  
of Volume as go up in scale.

#8. <sup>starting at one note drops 3 or 4</sup>  
times weaker beyond tenor

#9. Even Volume (Very) no sudden  
drop - notes fairly pure  
about like 5 - Very good  
string -

Even in Vol. loud - 2 notes  
impure - ~~one~~ one very bad note  
6 or 7 bowing (as then there is)  
good string -

QNT

R.A. Cremonesque Tailed #1426 <sup>Rx</sup>

- #10 Very loud - loudest yet  
fairly even vol only one place  
going high it suddenly changes &  
not severely - considering loudness  
the notes are fairly pure -

#11 Very ~~loud~~ fairly even - only 1 note  
impure -

#12

impure - Very uneven Volume <sup>Rx</sup>

R.A. Cremonesque Tailed #1450 <sup>Rx</sup>

#13

#14

#15

GUT

Thomas Orchestra #1536 R.H.

#16

#17

#18

R.H. Equitone R.H.

#19

#20

#21

GUT

Rox Equitone # 1546. Rox

#22

#23

#24

Amerital # 1446. Rox

#25

#26

#27

GUT  
Waterproof

Rest

#28

#29

#30

Albania

Rest

#31

#32

#33

GUT

La Tortissima

R.H.

#34

#35

#36

Nicola

R.H.

#37

#38

#39

GUT

Puretone.

Lo H

#40

#41

#42

GUT

Zr. Monesque # 1450

#13 Impure - loud  
after reaching a high point -  
while loud the note is  
inaudible - died it twice -  
Poor string -

14 Not loud like 13 -  
Sudden Change Volume on  
high - slightly, impure notes  
not good string -

15 Impure nearly all clear  
not extra long, some variable  
Volume Not good string -

~~Port~~ Port Cremonese #1426

10 = Even - fairly pure  
loud - good string

11 = fairly even Valleys -  
not low - but 2 high  
waters extraordinarily  
improve - poor string

12 = Very low, even -  
only 1 high mile somewhat  
improve - Very good string

Thomas Orchestra Rth

16 Not loud fairly  
even volume 2 imperfect  
notes - Not good string

17 = fairly loud fairly  
even some imper-  
notes - fair string

18 = little louder than

17. ~~for~~ Eosin - some  
impure water - fair string

---

Equitone R & H

22 = loud - even val

water nearly pure

good string

23 = Very loud -  
notes uneven at different  
points, + not suddenly  
on high - some notes  
unpure - only fair string.

24 = fairly loud all  
notes pure. Volume even  
except last 2 notes - drop  
considerable good string  
Especially for purity.

Amental test

#25 Not very loud

unparr in low -

quite drop in Volume on

last 3 lines -

Not a good study

26 = No test

27 = No test

28 Waterproof Rost

Pyralis - some  
imprints notes, Valium  
Varies all way thru

Not good string  
except Pyralis

29 = Very loud  
fairly Even & rather  
pure good string

30 = fairly loud  
impure & fairly  
Even Val Not good string

31 = Albania R. 14.  
Impure - variable.  
Valium Not good thing

[ITEM(S) FOUND IN BOOK]

Mr. Dawson -

We have the  
following engagements  
next week

Wed 8th Mrs Packard 2 P.M.

Thurs. 10th Mrs Curtis 9:30 am

Kennedy

**NOTEBOOK SERIES  
NOTEBOOKS BY EXPERIMENTERS  
OTHER THAN EDISON**

### **Notebook Series -- Notebooks by Experimenters Other Than Edison**

The eight groups of notebooks (796 books) in this subseries cover the period 1911-1929, with most dating from 1911-1919. About two-thirds of the books pertain to storage batteries. There are also eighty-two books relating to cylinder and disc records, as well as nineteen containing experiments on Edison's home projecting kinetoscope and kinetophone (motion pictures with sound). In addition, there are thirty-one books that were used during World War I for experimental work for the U.S. Navy and other war-related research; eighty-one books of chemical experiments; and a few books pertaining to electric vehicles and miner's safety lamps.

Within the six largest groups, related notebooks are arranged into subgroups, often according to the name of the experimenter. Among the Edison employees whose work is represented in these books are Leroy E. Briggs, Peter C. Christensen, Charles T. Dally, Frank Dettlef, Jr., William W. Dinwiddie, Elmer E. Dougherty, Zachariah P. Halpin, John A. Hanley, George E. Hart, William A. Hayes, Charles F. (Frank) Hunter, Miller Reese Hutchison, Absalom M. Kennedy, Ludwig F. (Louis) Ott, and Selden G. Warner.

Sixty-four books, which have indications of oversight or involvement by Edison, have been selected. The books are arranged in the following order:

- Group 1: Phonograph Record Experiments, 1911-1926 (82 books, 14 selected)
- Group 2: Kinetophone and Kinetoscope Experiments, 1911-1914 (19 books, 7 selected)
- Group 3: Navy and Wartime Research Experiments, 1917-1919 (31 books, 16 selected)
- Group 4: Chemical Experiments, 1911-1924 (81 books, 12 selected)
- Group 5: Electric Vehicle Experiments, 1911-1919 (9 books, 1 selected)
- Group 6: Miner's Safety Lamp Experiments, 1914 (2 books, 1 selected)
- Group 7: Battery Experiments, 1909-1929 (549 books, 6 selected)
- Group 8: General Experiment Books, 1912-1922 (23 books, 7 selected)

**Notebook Series -- Notebooks by Experimenters Other Than Edison**  
**Group 1: Phonograph Record Experiments (1911-1926)**

The eighty-two notebooks in this group cover the period 1911-1926. They were used by Charles T. Dally, F. Detlef, Jr., William W. Dinwiddie, Archie D. Hoffman, and Sherwood T. (Sam) Moore, and other Edison employees. Occasional notations by, or instructions from, Edison indicate his attention to their work. The experiments in these books pertain to the development and improvement of cylinder and disc phonograph records. Fourteen books with indications of oversight or involvement by Edison have been selected in whole or in part.

The notebooks are arranged in eleven subgroups:

1. C. T. Dally Disc Blanks Composition Books, Nos. 1-14 (14 notebooks)
2. W. W. Dinwiddie Disc Books (12 notebooks)
3. Disc Plating Books (16 notebooks)
4. Record Varnish Books (5 notebooks)
5. Cylinder Books (3 notebooks)
6. F. Detlef Disc Books (3 notebooks)
7. Miscellaneous Disc Composition Books (8 notebooks)
8. W. W. Dinwiddie Disc Mold Books (3 notebooks) [not selected]
9. Record Inspection Books (7 notebooks) [not selected]
10. Blank Transfer Inspection Books (3 notebooks) [not selected]
11. Miscellaneous Experiment Books (8 notebooks) [not selected]

**Notebook Series -- Notebooks by Experimenters Other Than Edison  
Phonograph Record Experiments  
C. T. Dally Disc Blanks Composition Books, Nos. 1-14**

These fourteen notebooks were used by Charles T. Dally and one unidentified assistant during the period 1918-1924 for experiments on the composition of disc record blanks. The research documented in these books ranges from tests of waxes, clays, and other compounds for discs to experiments on strengthening the blanks. Included are notes describing how the discs performed after being varnished, pressed, and printed in various ways and with different schedules. Many of the blanks were reinspected up to five years after they were produced, and there are brief comments on their condition by various unidentified employees. Some of the mixes tested in these books were subsequently used by William W. Dinwiddie in his experiments (see the W. W. Dinwiddie Disc Books).

Also included are notes on "drop tests" in which the discs were dropped to test their durability. Two entries in N-19-01-08 indicate that Edison tested the surface of the blanks produced for those experiments and performed some drop tests. A few brief comments by Edison on one of the tests can be found in a loose note inserted into that book. Some early notes on disc composition experiments can also be found in N-17-00-00.6, Notebooks by Other Experimenters—Navy and World War I Experiments—Miscellaneous Books.

One notebook, representative of the work in the other books but more heavily annotated by Edison, has been selected. A loose item containing instructions from Edison, inserted into another book, has also been selected.

| <u>Book #</u>             | <u>N-Number</u> | <u>Labels and Inscriptions on Front Cover</u><br><small>[additional information supplied by the editors appears in brackets]</small> |
|---------------------------|-----------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <b>Selected Books</b>     |                 |                                                                                                                                      |
| 2                         | 18-09-14        | "Disk Records No- 2 Book"                                                                                                            |
| 5                         | 19-06-03        | "Exp on Blanks 5" [loose item only selected]                                                                                         |
| <b>Books Not Selected</b> |                 |                                                                                                                                      |
| 1                         | 18-02-06        | "Dope for Records No-1 Book Feb-6-18"                                                                                                |
| 3                         | 18-11-13        | "Records No-3 Book"                                                                                                                  |
| 4                         | 19-01-08        | "Exp on Blank for Disc Record No-4"                                                                                                  |
| 6                         | 19-10-07        | "Exp. on Blanks No-6"                                                                                                                |

|    |            |                                                         |
|----|------------|---------------------------------------------------------|
| 7  | 19-11-19   | "No. 7"                                                 |
| 8  | 20-01-28.1 | "No - 8"                                                |
| 9  | 20-10-09   | "No - 9"                                                |
| 10 | 21-07-19.3 | "No. 10"                                                |
| 11 | 21-11-15   | "Nov 15-21_ + + No - 11 Exp. on clay<br>Blanks No - 11" |
| 12 | 22-06-02   | "May 22 - 22 Exp on Blanks No - 12"                     |
| 13 | 23-05-24.2 | "Exp on Blank June 29 - 23 No - 13"                     |
| 14 | 24-10-20.2 | "Exp on [Blank?] No - 14"                               |

**Notebook Series -- Notebooks by Experimenters Other Than Edison**  
**Phonograph Record Experiments**  
**C. T. Daily Disc Blanks Composition Book 2**  
**Notebook, N-18-09-14**

This notebook was used by Charles T. Daily during September-October 1918 for numbered experiments on disc blanks. There are also a few separate pages of notes by Edison, along with one note by Edison inserted into the book. The entries describe how each disc performed after being varnished, pressed, printed, or dropped. They frequently indicate numbered "mixes," some of which are identified as "TAE" mixes. The research in this book is representative of the work in the thirteen other books in the group. The front cover is labeled "Disk Records No- 2 Book." The pages are unnumbered. Approximately 120 pages have been used.

No-1

40 Resin  
11.7% S. Oil  
150 S. nap  
300 clay  
no strength

No-2

60 Resin  
11.7% S. Oil  
150 S. nap  
300 clay  
no strength

No-3

80 Resin  
11.7% S. Oil  
150 S. nap  
300 clay  
Breaks easily with fingers

10-4 100 Rec

11 % S.O.L

150 S. drop

300 Clay

Just about broke it with fingers  
Broke at 2 ft drop on blotting paper

10-5

120 Rec

11 % Straw cell

150 S. drop

300 Clay

and put through 190 mesh  
pressed into bluffs

on corn at 250 F

3 11 High 195 lbs Press one side Pullouts one

Broke on drop test 2 ft on blotting paper

#6

140 Posin

11. S. Oil

150 S. drop

300 clay

Swind, fair through 190 nest

5 in com at 250

5" High 195 Posin

} stuck a little  
on one side

Broken at 2 ft drop on Blotting paper

7

140 Posin

11% S. Oil

150 S. drop

300 clay

5 in com at 190 ft

3 " " " Posin 195 ft

Stuck a little on one side

#8

160 Roan

11% S.Oil

150 S. nap

300 clay

Pressed at 5 min com at 190°F

3 High " " 195°F Press

Pullouts

#9

180 Roan

11% S.Oil

150 S. nap

300 clay

Hard to powder it - sticks together

#10

160 Rosin  
11% S Oil  
150 S Nap  
2145 Chalk  
52h com at 190 ft  
3 " High " 195 Pines  
Pan Break with fingers

#11

160 Rosin  
11% S Oil  
75 S Nap  
750 Rotten stool A X  
5 min com 190 ft  
3 " " 195 Pines  
No Pullouts  
Breaks easily on drop test

12

160 Pours  
 11" S. Oil  
 75 L Drop  
 750 Rotting Litter AX  
 52" con at 200 F  
 3" High " 195 Pours  
 no pullouts  
 Broke 2 ft drop on hitting paper

13

100 Pours  
 11" S. Oil  
 100 L Drop  
 300 clay  
 Through 190 mesh -  
 5" con at 250 F  
 3" High " Pours 195 L.  
 slight pullouts  
 Broke 2 ft drop on hitting paper

#14

150 Rosin

11 1/2 S. Oil

6 1/2 fl oz

5 min com 250 F

3 " High " Press 145 - Pull onto streak

stood drop test on blotting paper

Broke at 11 ft floor drop

#15

160 Rosin

11 1/2 S. Oil

75 S. Trop.

400 Rotten stone (2 mks)

5 min com at 250

3 " High " " 195 Ell Run

Broke on first drop on blotting  
paper

#16

160 Rosin  
11 1/2 L. Oil  
75 S. Soap  
200 Kisselgan  
5 min con at 250 F  
3 " High " Press 195 lb

No Pullouts  
Ant break on beating pipe  
Broken at 4 ft above floor

#17

160 Rosin  
11 1/2 L. Oil  
75 S. Soap  
150 Kisselgan  
5 min con at 250 F  
3 " High " Press 195 lb  
Resin squeezed out - struck to mold

#18

160 Rosin

11% S. Oil

75 S. nap

900 Lithophone

5" in core at 250 ft

3 " High " " Runs 195"

Broke on drop test 2 ft on blotting  
paper

#20

150 Rosin

11% S. Oil

75 S. nap

6% flock

300 C. Clay

5" in core at 210 ft

3 " High " " Runs 195"

Small fullouts

OK on Blotting paper drop test  
Broke on 2<sup>nd</sup> drop on floor 11 ft

21

160 Rosin

11% S. Oil

75 S. Nap

200 Kisselgan

Dried Put through 190 Mesh

5 in low at 250 F

3 " High " Press 195

No Pull outs

Dropped 3 times on floor before

Braking

# 22

160 Rodin

11 1/2 S. Oil

150 S. Drop

300 Kieselgan

5 min cone at 250

3 " High " " Press 195"

Slight effluents surface not  
skinnier

Printed at 300 F.

3 min cone with ferris

2 " High 220 " "

Not full print

Drop on first floor drop test

# 23

160 Rosin

6% flops

11% S. Oil

150 S. trap

250 Kisselgaur

Dried ground in mortar tried to  
sieve through 60 mesh. flops  
stay on screen. tried off pen  
mill in, to.

Ground in mortar made  
blanks without success

22g pressed at 125 lb 304 trap 307 thick

20g " " 310 " 285 "

18g " " 310 " 287

Varnished & Baked in 24 Alcl  
varnish did not soak in, no more  
bubbles on than there was when varnish  
Printed one at 800 F 200 lbs press  
varnish cracked some pulled away  
from blank taking some of Blank  
with it

Second one stuck to mold  
pulled all apart

# 24

160 Rosin

6 1/2 flock

11 1/2 L. Oak

200 S. Soap

250 Kisselgum

Grind 2 inches from yellow plate  
in pipe plate

Looks different from No 23  
Looks whiter also looks as if it  
should have the extra soap  
Same as No. 23 pulled apart

#25-

150 Rosin

11% S. Oil

75 S. Nip

3% flock

300 Clay

Pullouts

Varnished and give Rag Baker in 20

Pressed 50 lbs at 300 F.

Blank squeezed out stick pulled apart

#  
26

150 Rosin  
11% S. Oil  
75% S. nap  
6% flock  
300 Clay

#27

150 Rosin

11% S.Oil

75 S. Soap

9% flock

300 clay

sticks were molded

varnished with Pig Balm

Pressed at 100 lb T 8/10 P to much

finer sticks pulled apart

#

28

150 Rosin

11% S. Oil

75 8 nap

12% flock

300 clay

#29

120 Rosin

11% S Oil

75 S Nap Mix Squirted  
300 clay through  $\frac{1}{8}$ " hole

6% flock

Made Planks 250  $\times$  125 lbs  
5th con

3" High, 25 lb Press

1 little pullout on one side  
surface somewhat porous. not  
ground fine enough

Varnished + Baked in 24 hld.  
looks like the Var., soaked in  
the porous places

Print

2 min exp at 315"

2 " to reach 180 lb Press

8 " at 150 " 225%

$\frac{4}{8}$  th of Print was OK & did not get  
the pressure. where it is printed it  
is a full print

Broke 3 ft on table ~~thick~~ drop

#30

100 Porin  
11% S Oil  
75 S rop  
6% flock

Not spinned though  
for shale

300 clay  
made Blanks

5 min con at 300 F

5 " High " 125 Press

Somewhat porous

Would have a shiny surface  
if ground fine enough

Var. and baked in 2nd Bed

Surface looks rough.

Print

2 min con 500

2 " to reach 330 + 200 lb

5 " at " 200 lb Press

Some of the porous spots showed,  
fine print where it is good

Broke on 2nd drop

#. 31

80 Resin

11. S Oil

75. S drop

6 1/2 flask

mix spurted (thru)  
82 hole

300 clay

5 min corn at 300 F

3 "

"

125 Press

Porus slight Pull out on one side  
bar + packed in 2 + Rd

Surface looks rough

Print

2 min corn at 300

2 " to reach 330 at 200 lbs pressure

5 " at " " " " " " " " " "  
A little hard to extract. Varnish loosened  
at a couple of places - a few cracks in  
center - full print

Varnish cracked more after standing  
Broke at first drop

32

60 Roach

11% L.O.

75 S. drop

6% flock

300 clay

5 mi con at 300 ft

6 " high " 125 lbs

no Pullouts

Porus

for + Pinter in 24 Rd

Loose porus

Pink

2 mi con at 300

2 mi to reach 330 at 330 ft

Pulled apart when extracted

cracks at first drop

#33 Printed

2 min con at 300

2 " to get to 200 pressure at 310

8 " at " "

Good print no pullouts - except on  
outer edge I think it sets to deep in  
mold. Broke on first drop on floor 2 ft

#34 Print

2 min con at 300

2 " to reach 125 pressure at 310

8 " at 200 " "

Good print to outside edge traps

off

Broke third drop of floor 0 ft

#3

" 29 mix Powdered put through  
30 mesh screen  
Surface not all filled porous  
slight pullout on one side

5 min con at 310 F

3 " High " " Press 15 lb

.248 thick

#34

29 mix Powdered put through  
40 mesh screen

5 min con at 310°

3 " High " " Press 15-

Looks fair not very porous  
one very small pull out

.253 thick

#35

Printed

2 min con at 300°

2 " to reach 150 Press at 310°

8 " at " " "

Full print outer edge pulls out  
Breaks at third drop 2 ft from  
floor. don't break dripping 2 ft from  
bleeding paper

Printed

2 min con at 300°

2 " to reach 150 Press at 310°

8 " at " "

Full print. outer edge pulls out  
matrix's don't fit, mold holders  
tight enough

dropped four times before breaking  
cracked at third drop - 2 ft from  
floor. don't break dripping 2 ft from bleeding paper

#35

29 min through 50 mesh

5 min con at 300°

3 " High " 310. Press 125 lb

Small pullout on one side  
slightly porous. can't see it  
by eye  
1.254 thick

#36

29 min through 60 mesh

5 min con at 300°

3 " High " 310 Press 125 lb

Pullout on one side

No-37

Printed

2 min con at 800

2 to reach 180 lb Press 320°

8 min at "

Squeezed out let mold come together  
struck on one side

P. 11

Set test

2 drops on floor at 5 ft. Plof.

#38

Printed

2 min con at 800°

2 to reach 150 lb Press 320

8 min at "

One side of mold cracked struck  
on edge

Drop test

3 drops on floor at 5 ft Press

#39

120 Rosin

11.1% S. Oil

75 S. nap

9 flock

300 clay

Rather dry, hard to mix with  
Squeint through 1/2 hole  
the powdered put through 30 mesh  
screen

#38

120 Rosin

11.1% S. Oil

75 S. nap

12 flock

300 clay

#39

Print

2 in corn at 3000  
2 " to reach 150 lb at 320  
8 " at " "

OK

Drop test

2 drops at 6 ft on floor snake

#40

2 in corn at 3000  
2 " to reach 150 lb at 320  
8 " at " "

OK

Drop test

2 drops at 5 ft on bare floor snake

#

39

120 Pos  
11.1% S oil  
100 S nap  
15% flock  
300 clay

#40

120 Pos  
11.1% S oil  
100 S nap  
18 flock  
300 clay  
Slight Pullout

#41

Print

2 min com at 300°  
2 to reach 150 lb Res at 320  
8 at " "

OK

Drop test

10 drops on bare floor at 3 ft

7 " " " 5-11-13 etc

#42

Print

2 min com at 300°  
2 " to reach 150 lb Res at 320  
8 " at "

OK

Drop test 2 ft drop on blotting paper 114

" 2 " " " bare floor 3

" 5 " " " 2.2 ft

#41

120 Rosin

11.17.8 Oil

115 S hop

21 Flock

300 clay

No Pullouts

#42

120 Rosin

11.17.8 Oil to the Rosin

115 S. hop = 99 grams

24 flock

300 clay

No Pullouts

Nos. 37, 38, 39, 40, 41 + 42 Squirt through  
1/32" hole the powdered screen not through  
coarse screen

#43

120 Rosin

11.1% S. Oil

150 S. nap

48% flock

300 clay

Could not agitate it. flock not  
separated when mixed. Balls up  
when mixed

#44

120 Rosin

11.1% S. Oil

120 S. nap

48 flock

300 clay

N.B. flock stays ball'd up

FF 45-

120 Rosin

11 1/2 S Oil

200 S Nap

48 Flock

300 Clay

N.G. Flock stays in balls - don't squirt  
plugs

No-46

120 Rosin

11 1/2 S Oil

115 S Nap

30 Flock

300 Clay

Just about right - it through S Oil

#47. 120 Rosin  
11 1/2 S.Oil  
100 S. nap  
35 1/2 Flock  
300 clay

#48

Painted

Con 2 min at 300

2 " to reach 700

Held 8 " at 700 - then cooled

2. Small pullouts

Surface time cooler by move

Average thickness .263

253

King bit

252

6.23 grams

273

266

1653

2.37 grams per  $\frac{1}{100}$  thick

wanted .200

237

444.56 g per Blank

Drop test

10 times at 1 foot

2 " " 2 feet - Backer on last drop

#48

Made a large Record of No 4 2 min

Used 630g in mold

5 min 800 at 300°

3 " high 450 lbs 310°

Stuck both pullout on both sides  
most of the pressure on center of  
blank

Varnished + Backed in 24 sld

The part marked in sketch was  
covered with large blisters underneath  
was cracks and full of pimplesGeneral surface was pimply  
on outside edge at two places  
varnish was off blank where it  
rested on Rack)

#110-49

120 Rosin

11 1/2 S. Oil

115 S. Nap

10 g. Brown Oil

300 C. Clay

Mix good Black

No-50

120 Rosin

11 1/2 S. Oil

115 S. Nap

5 g Lamp Black

300 C Clay

Good Black

#57

44.44.9 used for Blank - through 30/11/16

Catpaw 195

195

199

261  
11790

197 average

51

Made Large Record 11542mg  
Blank

5 min con at 310°

3 " High " 450 lbs Press 315

Stuck on both sides

Edged

Give 1 coat of varnish let dry in  
air one hr then put in oven for  
1 hr at 110° then 1 hr to reach 150°  
2 hrs at 150° then second coat of  
var then let stand 1 hr before  
going in oven then give Reg Bate  
Blank Blistered

T.A. don't  
think it was  
quite  
long to  
smoked coming  
out of press  
great blisters



#52

No. 42 Mfg through 20 mesh  
screen. Large blaut

5 min. con. at 310°

3 " High. 500 lb. press. 310°

53

No-42 mix <sup>set at 1/2</sup>  
 Put through small Rolls - 4 Red  
 one roll hot other hot to prevent  
 mix from sticking  
 Baked in oven all night at 240  
 (not var. over) shrunk in diam. some  
 Put two together in Pig Powder Blank  
 molds

Pressed

5 min com at 305°

3 " High 550 lb Press at 305°

Stuck to plates made a better Block  
 than by using powder.  
 average thickness .188

Varnish

Give one coat of var. let it dry in  
 air 1 hr. then put in oven for  
 1 hr at 100 then one hr to red heat  
 130 hold 1 hr at 130 in air  
 2nd coat let stand 1 hr then  
 Give Pig Bake. one out OK

Printed

2 min com at 300°

2 " 6 inch 800 lb Press 325°

5 " at "

surface good a few nicks on side better  
 than other

#34

4274

Planks made of bot under  
two pieces of leather  
stood in oven at 110 at 140  
then put in vac oven for 3 hrs at  
55 static pressure 12 in. vac  
Pressed without heat to 2000 lb  
Varnished. Let stand one hr  
then put in oven for 1 hr at  
110 then 1 hr to reach 130  
hold 1 hr at 130  
Some small Blisters in blank  
after first Baking  
Second coat of var then Reg  
Bake - Blisters disappeared on Reg  
Bake

#55- Dup of 54 Except  
after pressing at 2000 lb  
repressed 5 min now at 175°  
3 " high " 350 feet  
175°  
First coat Behind - OK

#56

120 Poin

11 8 Oil

115 8 Vap

24% flock

400 chalk

N.6.

#57

120 Rosin

11 S Oil

115 Benzol

24 1/2 flock

300 clay

No-58

1st coat of var

1 hr air dry

1 " in oven at 110

1 " to reach 120

1 " shield "

2nd coat

1 hr air dry

then var. stroke

Varnish Blistered

Blank - all raise up  $\circ$

2nd. Pig Bap.

Varnish Blistered

Printed. Pig - checked

Surface var

after 4 hrs. - long blank blistred

58

120 Rodin.

11% Oil

115 Alcohol - formulated

24% flock

300 clay

Grid 21

Made Blank on Leather of Gob

dryed in var oven - 2 1/2 hrs in var

Blank was blistred after baking

put in mold give 2000 Press look good

10-59

120 Run

11% Oil

50 Soap

24% flock

300 chalk

Small mixer

#60

120 Ros

11% S. Oil

50 S. nap

24% flock

300 clay

2. Large mass

#61

120 Ros

11% S. Oil

90 S. nap

24% flock

300 clay

H  
62

120 Ros  
11% S. Oil  
80% S. Soap  
24% from  
300 clay

col 3

74

63

120 Poo

11% D. oil

50-cc Alcohol

24% flock

300 . Clay

# 64

120 Pae'

11% S. Oil

2nd nap. ? to much)

dont know weather its 500 or 600

2.4% flock

600 chalk

my was dried on steam plate  
all crumbled up some of the lumps

fig. as 2%

molded

5 com at 300°

3 high 450 lb 315°

surface porous

11% bagged in oven

Bake

Let stand 1 hr in air

1 hr at 110° in oven

1 " to reach 130°

Held one hr "

Sol

65

2 Blankets of NO-63 Mif

Pressed to within 1/2 inch

dried in vac at 12-24" vac

1 hr without heat

1 " with " no pressure

1 " " 20 lb pressure

1 1/2 " " 40 " "

1/2 " Cool with water

Both Blankets raised up

Put in oven at 200° for 1 hr

Pressed in cold mold at 200° pressure

1 had a pull out

1 Cool & Vacuum

let stand 1 hr in air

put in oven 1 hr at 110

1 hr to reach 130

Hold 1 hr at 130

then give second heat let stand 1 hr

then give second heat

Blank slightly blistered

#66, Black - No 65 mixed  
made blanks in mold, 1500 lb Press  
paper on mold plates (bind in vac. full  
1st coat of var # Raisins)

let dry 1 hr  
then in oven 1 hr at 110°  
" 1 hr to reach 130  
hold 11:00 at 130  
2nd coat var

let dry 1 hr before going to oven  
then give var coat.  
Raisins in blanks not anymore

67

120 Resin  
11 1/2 Oil  
25 Alcohol  
24 1/2 flock  
300 chalk

68

120 Poin  
11 1/2 S.O.I  
25 Alcohol  
24 1/2 flock  
400 Rottstein AX

69 \*

120 Resin

11% S Oil

25% Alcohol

24% flock

Nb

Kisselgum

#

70

120 Robin 27.7%  
24% flock 5.4%  
300 Chalk 67.5%

for Blankets

#

70-A TAE

1500 wood fibre

1140 chalk

420 Milled Robin

all wood fibre in with rosin

after 5 min cleaned mixing arms

then every 15 min put in 285 chalk  
screened through 20 mesh

Var Roy Protected 200g

Made 5 Blankets - 2 Blankets looks as if  
they only had 1 coat of Varnish

#71 T & E Dig

540 Rosin

518 flock

2700 Chalk

Purim all flock + melted Rosin  
the every 15 min 900 chalk (not good dig  
screed through  $\frac{1}{8}$  mesh

3 Blanks made

Big 2 coats of varnish Reg Baker

<sup>Pipe</sup>  
Rough, tripe

72

5.40 Ross

5.15 flock

27.00 cholla

PM 3.50 cholla in with melted resin

1.5 chond

1.5 chond

12.5 172 flock in

13.8 " "

2.0 " "

8-20 4.50 cholla in

2-40 4.50 " "

3-5 4.50 " "

3-35 finished

2 Blankets

#73

1/2 of No 72 Batch put through  
coffee mill

Blanks smooth but can see  
hard to spot. Bad mix

#74

600 Rosin

518 flock

2700 chalk

1350 g chalk all the method

Rosin

after running 5 min clean

hoddles

Run 15 min more and clean

after running 25 min when mix is

like ros add 172 flock

15 min more add another 172 flock

25 " " " " 172 flock

20 " " " " 450 chalk

20 " " " " 450 "

25 " " " " 450 "

Then Run 30 min (finished)

75

656 Resin

518

flack

2700 chalk

Mixed the same as <sup>the</sup> 74

<sup>10</sup>  
76

700 Plover

5-18 flock

2700 chicks

Mixed the same as No 74

Var Reg No - 1841-E

$\frac{1}{2}$  Pint = 236 cc contains .94 g Para = 1%  
add  $\frac{2.82}{3.76} = 4\frac{1}{2}\%$  " = 5%

$\frac{1}{2}$  Pint = 236 cc contains 7.56 g  $\frac{1}{4} = 7.8\%$   
add  $\frac{2.06}{9.62} = 2.2\%$   
" = 10%

### # 77 Varnish

add 2.06 g  $\frac{1}{4}$  and 2.82 g Para  
to 236 cc Reg 1841-E Varnish  
4 times as much para = 4% to Para  
" "  $\frac{1}{4} = 10\%$

Dissolved the  $\frac{1}{4}$  + Para in  
25 cc alcohol then filtered through  
lime then added to the Var.

### # 77. A Varnish - for Soft Blanks

5% Para

add 4.12 = 10%  $\frac{1}{4}$  } to 472 Varnish  
" 7.52 = 5% Para

77. B Varnish = 2% Para

1 10% -  $\frac{1}{4}$

add .94 g Para to 236 cc Reg Var  
2.06  $\frac{1}{4}$

#78

## Baking schedule

$\frac{1}{2}$  hr at 110  
 $\frac{1}{2}$  to reach 140  
 $\frac{3}{4}$  to " 140  
 1 " 150  
 Held 5 hrs 150

No-1 Baking  
Schedule

#78

70 Blank with two 77 Vairid  
 Bent over in oven at 150° when  
 baked  
 Straightened one on hot  
 mold

Printed 2 min on 125-lbs  
 10 min at 150°  
 started to squirt out  
 from molds soon as hand on  
 gauge began to leave print/gun  
 back wiped up through vacuum

78A

110-78

Printing schedule

2 min on at 212

2 " at 190 to reach 250 Pss

Squirt out when pressure reached  
 about 400?

78-13

top of No 78 Except different printing  
 schedule

2 min on at 150

12 " high 125-lbs press at 150 to 155°  
 about as high gun as it will extend / before wear

No-79 mix same as no 70 Except use  
dry instead of chalk  
960 Rosin =  
230.4 flock =  
2400 day =

NG  
To dry

#80 - Printing scheduled

2 min. con. at 220°

12 " High " 100 Press. 220°

Few small spots not full print

Blank squeezed out about 1/32 inch

OK for ware at 20 times

Drop test 53 times one foot high

No. 80-A (Printing scheduled)

2 min. con. at 200°

12 " High " 125 lb Pressure 200°

Shows ware at 5 times

No. 80-B (Printing scheduled)

Con 2 min at 150°

+ " High at 75 lb pressure 150°

then drop pressure to 75 lbs + raise  
temp to 236 for 10 min

#80-C

con 4 min at 160°

4 min High 75 lb pressure at 160°

then drop pressure to 75 lbs at 230°

for 10 min Varnish and Record cracked

due to being cracked broke on temp

#80-D

sub of No. 80-C cracks put a ring between  
molds to prevent Record from squeezing out -

#80

70 Blank No. 77 Varnish

Baked

1/2 hr at 110°

3/4 to reach 120°

1 " 130°  
Hold 7 hrs at 140°

#1 Scheduled

full print

Good full print

#81

~~6110 Blank~~

~~no 77 finish~~

~~" Baking Schedule~~

110-1 Pressing Schedule

Bring to contact + hold 4 min.  
when temp. has reached 160 by  
thermometer on pallet

Then keep temp. still 160  
Raise pressure to 750 lbs Hyd.  
static hold for 4 minutes

Then reduce pressure to 750 lbs  
Hyd static + raise temp. to 230 +  
hold 10 min - chill

(#70 mix)

120 Resin

15 Lbs oleum

28.4 - flock

300 Chalk -

WEight out Chalk in 3  
batches. have it all hot.

Put in  $\frac{1}{3}$ rd of Chalk, all  
the flock & all the

Resin.

Mix till perfect then  
add  $\frac{1}{3}$  more chalk  
mix till perfect  
then add final or last  
 $\frac{1}{3}$ rd of Chalk & mix till  
perfect.

Baking Schedule No-2

1 hr to reach  $110^{\circ} F$

1 " " 120

1 " " 125

1/2 " " 130

2 " " 140

Held at 140 for 8 hrs

#81

\$110 Blank

No-77 Varnish

11-2 Baking

No-1 Printing schedule

1000 Pouch = 25.7%  
248 Bottom = 6.1%  
2100 Chalk = 66.9%

Saged a little when boiler temp did  
reach 145 for <sup>11th</sup> ~~first~~ time  
Squeezed out, <sup>11th</sup> ~~first~~ when over temp pressure at  
230 temp I think due to fire entering soon as  
taken from oven after straightening

# 82

117 Blanks { 1000 Resin 25%  
280 Cotton 7%  
2720 Chalk 68%  
No-77 Varnish  
" 2 Baking schedule  
" 1 Printing "

A little crossfeed after baking  
~~at a full print on outside edge~~  
~~Blank Blanks~~

#83 118 Blank  $\left\{ \begin{array}{l} 1000 \text{ Rosin} = 25\% \\ 320 \text{ Cotton} = 8\% \\ 2680 \text{ Chalk} = 67\% \end{array} \right.$

No. 77 Varnish

" 2 Baking schedule

" 1 Printing schedule

Don't look as if it sagged any

Not a full print on outside edge

Run Blank

H

84

8-119 Blank { 1000 Resin = 25%  
360 Cotton = 9%  
2640 chalk = 66%.

No 77 Varnish

" 2 Baking schedule

" 1 Printing schedule

Did not salt any when baked  
not a full print. Bad blank

One test 100 times OK

" 200 " shows a little wear

#85

#70 Blank Pressed in a Reg  
Powder Blank mold

5 min low at 180° F

3 " High at 750 lb press at 180° F

Pullouts on both sides (smooth surface)  
Smooth surface after baking no blister or  
bubbles

No 77 Varnish

" 2 Rafee schedule

" 1 Print "

#86

No. 70 Blank pressed in Pig Powder  
Blank mold

5 min. cure at 165°

3 " High 75 lb. press at 165°

Pullouts on both sides not bad as

No. 85 (smooth surface)

not quite as good as No. 85

#  
87

No 70 Blanket put in oven without  
Varnish Baked at No. 2 schedule  
then straightened

No. 77 Varnish

" 2 Baked as scheduled

" 1 Printed as "

Sep 14-18

#88

122 Blanks { 1200 Rosin 30%  
400 Cotton 10%  
2400 chalk 60%  
← went away when Baked

No. 122, 123, 124, 125 and 126,  
Blanks were varnished with before they  
that was in ice-box 3 days it looked  
thicker than when it was fresh

No. 77 Varnish

" 2 Baking schedule

extra 1/2 + 1/2

#89

\*123 Blanks { 1250 Resin = 32 %  
450 Cotton = 12 "  
2240 Chalk = 56 "

No. 77 Varnish

" 2 Baking schedule

Printing schedule

4 min. con. at 180°

4 " High 75 lbs at 180°

10 " 75 lb press at 230°

One side full of Pullouts

Other side no pullouts - only a few  
spots not full print

Blank squeezed out 1 1/2 inches when  
printed

#90

\*124 Blanks

1400 Resin - 35%  
600 Cotton - 15%  
2000 Chalk - 50%

No-77 Varnish

" 2 Bake schedule

# 91

to 125 Blank 1320 Rosin - 38 %  
600 cotton = 15 "  
2080 chalk = 52 "

No 77 Varnish

" 2 Baking-schedule

" 1 Printing-schedule except  
High pressures of 725 lbs

#92

\*-126 Blanks 1080 Room ~ 27%  
320 Co. 100% = 8"  
2600 Shelf = 65"

No-77 Varnish

~~" 2 Baking scheduled~~

No-77 Varnish

" 2 Baking scheduled

" 1 Printing scheduled

not full print

#93

126 Blanks

77 Varnished then put in Vac. for 2 mins.  
at 20 inches of mercury, then let stand  
15 min. before second coat, then  
2 min in Vac 20" mercury  
Then Baked No 2 schedule

No - 2 Bake schedule

Printing schedule

4 min. Com at 180°

2 " High 75 lbs at 180

10 " 75 lbs press at 230

#3 Bake schedule  
for soft blanks  
using 5% Para

1 hr to reach 110

1 " " 120

1 " " 125-

1 " " 130

Hold 8 hrs at 130

#94 No 70 mix for Blawie  
Made with  $\text{CO}_2$  gas going  
in mixer when made, almost  
when heat in oven

94 A

No. 70 Blawie made in mixer  
with  $\text{CO}_2$  then put in oven  
without gas or pressure

# 95-

138 Lead Reservoir

26.8 ft x 2

300 chalk

N L

96.

A 126 Blank

No-77 Varnish

" 2 Bake

Printing Schedule

4 min con 150°

2 " High 925 lbs 180°

then 10 min at 230° - 75 lbs press

#97. Blank

1200 Rosin

230 flock

2400 clay

not quite enough Rosin to dry

#98

1320 Rosin - 165 flock

230 flock

2400 clay

just about 1/2 of the flock is  
underneath and gets stuck to the  
cold

#99

not full print

stick on one side

varnish not cured - can mark it  
with fingernail

#99

1420 Rosin = 177.5

230 flock

2400 clay

Got all the gots off

No-77-A varnish

3 Bales

Prints school

400 at 180°  
2 High 75 lb press at 180°  
10 at 75 lb press at 250°

#

99A Sup of no 99 except printing press

4 min con at 21.0°

2 " High " 75.0 lb at 21.0°

10 " 75.0 lb press at 23.0°

Varnish not cured. Stuck on ball

sides  
not full print. Squeezed out about  
2 1/2 inches

100

~~4220 24 min~~  
~~21.0~~  
~~75.0 lb press~~

75.00

Mix for Blanks

12 Blonite

5 Mangak

10 Posit

No-101

Rimfeed - cracked  
Blank cracked - Pullouts  
Printed Inspected  
Oct 4 Nov 13

# 102

Rimfeed Blank cracked  
Printed Inspected  
Oct 5 Nov 13

# 101

No-100 mix 177.5g - 35%  
28.8 flock — 5.6%  
300 clay — 59%

1 coat of Varnish with 2% 10% 10%  
Dirt Rag. Raked in 24 Bld.  
Reg. Printing in 100% - Very yellow down, down  
Did not take to mold but hard to  
get out of mold. Use 10 rings to make  
mold deeper  
Cracked on 100% 100%

102

No-109 mix 165g 33.3  
28.8 flock 5.3  
300 clay 60%

Made into 100% 100% 100%  
cool then left in 100% 100%  
could not get it to 100% 100%  
to a disk only pressed 1/2 way  
- keep it but put it into 100% to the  
press - come out OK  
Dirt one coat of Varnish. Raked in 24 Bld  
100% 100% 100%  
ingrained out out 1/2 inch. Good full print  
which on one side. one side of 100% out  
100% 100%

1103

150 No-100 dirt  
28.8 ft. thick  
300 clay

Roofs as in  
this map is about  
the same as the  
one in the map

#  
104

No-98 Blank with one coat of  
Varnish 2j. Para 10% - 6.4  
not Baked. cured in press

Printing technical

4 min. temp at 180

2 " High 750 lb. 180 deg. air heat 2"

10 " 750 lb. pressure at 180

Had to break down in 10 min. would  
stick bad

No-105-

No-98 Blank with 1 coat of  
Reg Varnish - not Baked cured in  
press

#106

No-99 Blank with 1 coat of  
Varnish 2 1/2. from 10% - 4 - not Backed  
and in press

#107

No-99 Blank with 1 coat of Vg.  
Varnish not Backed and in  
press

#108

#94 Blank 1 coat of Varnish  
with 2 1/2 parts 10 1/2% not baked  
cured in press

#109

#94 Blank 1 coat of Poly Res.  
not baked - cured in press

110

# 10 + Blank

1 coat of Var 2 1/2% Para - 10% 6 1/4  
not Baked Cured in press

2nd coat Baked 100, 106, 107, 108, 109

110 Baked 100, 106, 107, 108, 109

111

9 1/2 Blank

11-A Varnish

11-B Bake

Printing scheduled

4 min at 180°

2 " High 750 lb. 180°

10 " 750 lb. press at 250°

Stack worn uniformly

#113 - Rinkled & cracks in center  
Fullouts - Printed Oct 7. Inspected Nov 13

#113

Prepared - got piece <sup>at 124"</sup> had 2 small fullouts

#113-B

to p. of 113-B

Bad fullouts Part of Blanker come  
with it Printed Oct 14 Inspected Nov 13

113-A Rinkled - Record cracked

Printed

Oct 9

Inspected.

Nov-13

#112

1309 No 100 print  
288 block  
500 clay

#113

259 Melconite 377

12 block

6 - 10.6% <sup>of 113</sup> to the

349 clay 57

1 coat of Reg Varnish - Reg Bake in 24 Blk

Printed Reg. 113

113-A

top of 113 Epox 2 coats of Varnish

Printed Reg 115 lbs steam 220°F

Blank Prepared out between models about 2" on  
one side - Etched from model frame  
Slightly Rinkled - Bad P. O

#115 Printed  
Oct 7

Imprinted  
Nov 13

#115 Rinkled - Pullouts - 3 cracks  
Center Printed Oct 9 - Imprinted Nov 13

#115B Rinkled Pullouts -

#115-B

Run of 115-A Except High pressure  
when printing was 400 lb. - Squeaked out  
just as much as 800 lb pressure  
not as good a print as No-115-A.  
Bad pullouts on both sides

115-A Rinkled - 3 cracks in center  
Printed  
Oct 9.

Imprinted  
Nov 13

#114

2 Blanks No-101 with 1 coat of Reg  
Varnish - Baked in 24 Bed

#115

4 No 101 Blanks with 2 coats of  
Reg Varnish - Baked in 24 Bed

Printing scheduled

2 runs on 200 lb pressure

2 " " 200 lb pressure

2 " " 200 lb pressure

station 300° F

Bad pullouts on both sides

115-A Run of No 115- Except had 115 lb steam  
220° F - Squeaked out about 1 1/2 inches between  
molds - Print OK

# 116

|               |                             |                      |
|---------------|-----------------------------|----------------------|
| 270 Gilsonite | $\frac{1}{3}$ distilled oil | $\frac{1}{3} = 38\%$ |
| 42 g flox     |                             | 6%                   |
| 378 clay      |                             | 54%                  |

to dry

# 117

|               |                             |                        |
|---------------|-----------------------------|------------------------|
| 300 Gilsonite | $\frac{1}{3}$ distilled oil | $\frac{1}{3} = 41.3\%$ |
| 42 flox       |                             |                        |
| 378 clay      |                             |                        |

Very stiff mix could not make a ball of it put in press - about 4 lumps pressed good except at one spot on outside edge. Looks as if can't keep it hot enough although hot as steam will make it.

Pressed in got press at 126 °K

#118 Very Bodily Rinkled

Blank cracked 5 places

|         |           |
|---------|-----------|
| Printed | Inspected |
| Oct 9.  | Nov 13    |

#119

Very Bodily rinkled

Record cracked 4 places

|         |           |
|---------|-----------|
| Printed | Inspected |
| Oct 7   | Nov 13    |

#118

325 Gibsonite 1/3 distilled oil - 46.9%

42 flock = 6.1%

325 Clay = 46.9%

2 coats of Reg Varnish Varnished & Baked in 24/136d

Surface looks granular after flocking

Reg Printing scheduled 120 lbs steam

326° F. - Squirted out 2 inches - Very thin

Record cracked in 8 different places

Fine full print

#119

420 Gibsonite 1/3 distilled - 60%

70 flock = 10

210 clay = 30%

2 coats of Reg Varnish Baked Reg in 24/136d

Surface looks granular after flocking

Reg Printing scheduled 120 lbs steam

326° F. - Squirted out 2 inches - Very thin

Record cracked for places

Fine full print

#120

Very Poorly rimpled  
Record cracked in places  
Printed      Inspected  
Oct. 9      Nov. 13

No. 121

Rimples all over not cracked  
Printed      Inspected  
Oct 14      Nov 13

(Oct. 7-14)

#

120

490 Gilsonite 1/8 distilled 70%  
105 Cotton flock 15"  
105 clay 15"  
Weight of Blend 325g  
2 Coats of Reg Varnish Reg Buffer in 24 Bld  
Reg. Printing scheduled 120 lb steam 326°F  
Squir out 2 inches between molds - very thin  
Cracked  
Fine full print



No. 121

260 Gilsonite 35.3  
75 flock 10% - 22.3% to the Gilsonite  
400 clay 54.4  
2 coats Reg Varnish + Reg Buffer in 24 Bld  
Reg. Printing scheduled 320°F  
One pulled in center of Record  
OK print

1053

#  
122

Ripples all over not cracked  
Printed Inspected  
Oct 14 Nov 13

123 Ripples all over not cracked  
Inspected Printed  
Nov 13 Oct 14

#122

266 Gilsonite - 33.5%  
115 flock 14.9% 30.7% to the Gilsonite  
400 clay 51.6%

Mix stiff won't stand any more flock  
2 coats Reg Varnish + Reg Paper in 2 4 Bed  
No pullouts - Reg Printing scheduled  
flowed  $1\frac{1}{2}$  inches when printed  
OK print

#123

260 Gilsonite 36.8%  
145 flock 20.5% - 35.8% to the Gilsonite  
300 clay 42.5%  
2 coats Reg Varnish + Bed in 2 4 Bed  
Reg Printing scheduled - 12 min  
No pullouts - flowed  $1\frac{1}{2}$  inches when pressed  
OK print

124

Ruffles all over not cracked  
 Printed Inspected  
 Oct 14 Nov 13

#

124

260 Bilsonite 34.8%

185 Flock 24.8% = 41% to the Bilsonite

300 clay 40.1%

Very stiff. Won't stand any more flock  
 or clay. Temp of press to press blank 137°F

2 coats Reg Varnish

Reg Paper Id 24 Bd -

" Printing schedule 12 min

No pullout - flowed about 1/2 when pressed  
 OK print

#125

259 Coal tar 1/4 distilled 37%

42 flock 6% - 10.6% to the tar

399 clay - 57%

To dry

#126

300 Coal tar  $\frac{1}{4}$  distilled off  
352 clay  
to much clay. made it dry  
not enough to make a sample  
~~Cracked in 3 pieces drilling center hole~~

#127

600 Coal tar  $\frac{1}{4}$  distilled  
600 Clay  
all the clay  $\frac{1}{2}$  will stand  
Cracked in three pieces drilling center  
hole

#128

Scarcely any Ripples  
Blocks cracked  
Printed Oct 16 Inspected Nov 13

129

no Ripples cracked several  
places  
Printed Oct 16 Inspected Nov 13

#128

600 Coal tar  $\frac{1}{4}$  distilled 80.  $\frac{1}{4}$   
150 Flock. — 20%  
2 Coats of Reg Varnish + Reg. Bake in 24 Bed.  
Reg Printing scheduled - 324° F  
Full print. Flowed out between molds 2 inches  
Cracked in four places

#129

600 Coal tar  $\frac{1}{4}$  distilled 59.  $\frac{1}{4}$   
100 flock — 9.8  
315 clay 31  
2 Coats Reg. Varnish + Baked in 24 Bed  
Reg Printing scheduled - 324° F  
Full print. Flowed out between molds 2 inches  
Full of crack - not Varnish record

#130

No Ripples Blank crasped  
Printed Inspected  
Oct 16 Nov 13

#131

Badly Rimpiled - Pullout Bar  
Printed Inspected  
Oct 15 Nov 13

#130

600 Coal tar  $\frac{1}{2}$  distilled  
65 flock — 5.9%

450 clay

2 coats Reg Varnish + Baked in 2 + Bld

Reg Printing scheduled 320° F

Full print flowed about 1 inch between

plate molds

Record full of cracks

#131

250 Gilsonite — 33.3%

100 Wood flower 13.3%

400 clay 53.3%

2 Coats Reg Varnish + Baked in 24 Bld.1

Reg Printing scheduled — 320° F

Full print flowed about  $1\frac{1}{2}$  inches between  
molds

#132

Body Rinkled - small P.O.  
small crack on margin

Printed

Oct 18

Inspected

Nov 13

133

Body Rinkled. No cracked

Printed

Oct 18

Inspected

Nov 13

Oct 16-18

#132

250 Silsonite 35.7%

100 Wood flour 28.5%

250 Clay 35.7%

2 Coats of Reg. & Reg. Boker 2 + 4 Bld

full print floured 1/2 inches when

printed

Reg Printing scheduled 320°

#133

250 Silsonite 30.3%

50 Wood flour 6.1%

525 Clay 63.5%

2 Coats Reg. Boker & Reg. Boker 1 + 2 Bld

full print floured 1/2 inches when printed

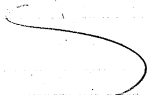
Reg Printing scheduled 320°

[ITEM(S) FOUND IN BOOK]

Schedule # 2

|    |               |      |        |
|----|---------------|------|--------|
| 1  | Hour to reach | 110° | Fake   |
| 1  | "             | "    | 120° " |
| 1  | "             | "    | 125° " |
| 1½ | "             | "    | 130    |
| 2  | "             | "    | 140    |

Hold at 140 for 8 hours.



[ITEM(S) FOUND IN BOOK]

$$\begin{array}{r} 175 \\ 30 \\ \hline 205 \\ 295 \\ \hline 500 \end{array} \quad \begin{array}{l} 35\% \\ 6\% \\ 57\% \end{array}$$

$$\begin{array}{r} 155 \\ 30 \\ \hline 185 \\ 315 \\ \hline 500 \end{array} \quad \begin{array}{l} 31\% \\ 6\% \\ 63\% \end{array}$$

[ITEM(S) FOUND IN BOOK]

|         | % Bismonte<br>to the<br>total mix | % Flock to<br>the total<br>mix | % Flock to<br>the Bismonte | % Clay to<br>the total mix |
|---------|-----------------------------------|--------------------------------|----------------------------|----------------------------|
| No-113- | 37% —                             | 6% —                           | 10.6% —                    | 57%                        |
| "-121-  | 35.3% —                           | 10% —                          | 22.3% —                    | 54.4%                      |
| "-122-  | 33.5% —                           | 14.9% —                        | 30.7% —                    | 51.6%                      |
| "-123-  | 36.% —                            | 20.5% —                        | 35.8% —                    | 42.%                       |
| "-124-  | 34.8% —                           | 24.8% —                        | 41.% —                     | 40.                        |

**Notebook Series -- Notebooks by Experimenters Other Than Edison**  
**Phonograph Record Experiments**  
**C. T. Dally Disc Blanks Composition Book 5**  
**Notebook, N-19-06-03**

This notebook was used by Charles T. Dally and one unidentified assistant, primarily during June-October 1919. Each experiment involves a different preparation of ingredients for the disc record blanks. Varnish preparations and baking schedules also vary. The blanks were prepared in 1919 and then inspected in 1920, 1921, and 1923. There is also a series of tests on clay. Inserted into the book is a 6-page list by Edison of projects for Dally, some of which correspond to the experiments in the book. The front cover is labeled "Exp on Blanks 5." The pages are unnumbered. Approximately 130 pages have been used.

Only the list by Edison has been selected.

[ITEM(S) FOUND IN BOOK]

Daily May 14/19

Determine & record  
carefully the following

1<sup>st</sup> Blow & form the Piss + Oil  
in large pots holding from  
50 to 100 lbs. - & take samples  
out at times when you  
think best so as to find  
out from these samples  
the best & shortest time  
of Glacering. The best  
temperature ~~also~~ so when  
we get in fr we will  
know just how to get  
the best results.  
Before you start on

[ITEM(S) FOUND IN BOOK]

2

large pot you should  
find out by Experiment  
with present small  
pot what amount of  
Lead, Manganese or  
other stuff is best or if  
its needed at all & the  
best temperature.  
Then you can go to the  
big pot more intelligently

2nd find out the minimum  
time of grinding, which  
with best siving will  
produce 100% production  
& best surfaces

[ITEM(S) FOUND IN BOOK]

3

2<sup>nd</sup> Continued -

Determine beginning  
Records the minimum  
amount of dampblack  
that will do the work,  
also if the dampblack  
hurts the flowing or  
hits the surface

3<sup>rd</sup> As an Experiment  
Make some records  
1 turned down to less  
diameters one  $\frac{3}{32}$  -  
1  $\frac{1}{8}$  one  $\frac{1}{32}$  one  $\frac{3}{16}$   
1  $\frac{1}{4}$  1  $\frac{3}{8}$  + 1  $\frac{1}{2}$

[ITEM(S) FOUND IN BOOK]

4

3rd

This will show us just  
what Margin we have  
The resultant records  
should be recorded in  
book marked for defects  
apart away for time  
tests to see if recent  
stratification of Greenwich  
will produce cracks

At the 3 Regular Records  
1 hour of monitoring should  
be put in the 1st chest  
& dated, see no water  
can get on them

[ITEM(S) FOUND IN BOOK]

5

5th Minimum time to get  
good mixing in mixer should  
be ascertained also  
best temperatures to have  
the Room Oil mix when  
poured in also if heating  
the Chalk to some temperature  
or higher than the mixer  
before its put in will  
shorten the mixer time  
also if circulating hot  
air through mixer will  
shorten time the air being  
heated to some or higher  
than the oil use thermometer as  
far as possible & record temp.

[ITEM(S) FOUND IN BOOK]

6

6th = print a few records  
I would soon if no new  
in find (TH) record where  
Taps don't touch blank  
to see if it is OK & no bugs  
are found -

7 = also best type & method of  
screening it to get properly  
account of % of residues  
etc & all data -

8 Best device for automatic  
loading of mounds 2

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**END**

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We thankfully acknowledge the vision and support of Rutgers University and the Thomas A. Edison Papers Board of Sponsors.

This edition was made possible by grant funds provided from the New Jersey Historical Commission, National Historical Publications and Records Commission, and The National Endowment for the Humanities. Major underwriting has been provided by the Barkley Fund, through the National Trust for the Humanities, and by The Charles Edison Foundation.

We are grateful for the generous support of the IEEE Foundation, the Hyde & Watson Foundation, the Martinson Family Foundation, and the GE Foundation. We acknowledge gifts from many other individuals, as well as an anonymous donor; the Association of Edison Illuminating Companies; and the Edison Electric Institute. For the assistance of all these organizations and individuals, as well as for the indispensable aid of archivists, librarians, scholars, and collectors, the editors are most grateful.

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**Thomas A. Edison Papers  
at  
Rutgers, The State University of New Jersey  
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The original documents in this edition are from the archives at the Edison National Historic Site at West Orange, New Jersey.

ISBN 978-0-88692-887-2

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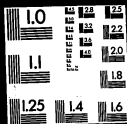
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